CITY OF MANCHESTER.

REPORT

ON THE

Health of the City of Manchester,

1896.

BY

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My Lord Mayor, Aldermen, and Members of the Council,

I have the honour to present to you my Report on the Health of Manchester for the year 1896.

The mortality during last year was low over the country generally, and this City partook of the general improvement. The information derivable from a study of the mortality statistics is set forth at length.

As regards the whole City, the recent increment of prosperity has produced a tendency to overcrowding, one of the gravest conditions with which we have to contend, and has indirectly checked to some extent the efforts which are being made to improve the habitations of the poorer classes.

It may be hoped that this is only a temporary effect of what should be a great public benefit.

Great inequalities are discovered on a study of the health conditions of the different districts of the City for several successive years, which indicate those calling for special effort.

The sections of this Report dealing with the infectious diseases treat of several matters of importance.

A large section of the work done in connection with fever, viz.,—the extensive alterations and improvements in connection with the cases reported—does not admit of tabulation or discussion, but is recorded in the Annual Statement of the Sanitary Department, by which it is undertaken and carried through.

Under the sections dealing with fever and diarrhœa will be found particulars which amply illustrate and prove the general injury inflicted by our method of collecting excreta. To the philosophical mind it must be always matter for misgiving whether any specific proposal does not introduce fresh evils comparable with those which it is intended to remove. Such is not here the case.

There can be no question that the substitution of the water-closet system, under adequate provision for efficient workmanship and administration, would lead to a decided diminution of mortality, and would much more than recoup the expense which it would entail.

The proposals made in 1894 for a hospital provision adequate to the defence of the City against the ordinary infectious diseases, which have been partially fulfilled by the taking over of Monsall Hospital, should now be completed by the erection of a Smallpox Hospital, and by a reconsideration of the arrangements for the removal of patients, and for disinfection.

It has not been thought desirable to make any observations on Monsall Fever Hospital in this Report, on account of the short period which has elapsed since the Hospital came into the possession of the Corporation.

I wish here to acknowledge my obligations to my Clerks, and especially to Mr. T. L. Ellwood and Mr. W. H. Roos, for the great assistance which they have given me in the work of the Office, which has much increased.

It is necessary, also, to add that this Report must be taken in conjunction with the Annual Statement by Mr. A. T. Rook, who has obliged me with a synopsis of the year's work in his department.

I have the honour to be,

Your obedient Servant,

JAMES NIVEN,

Medical Officer of Health.

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VITAL STATISTICS.

ON THE MARRIAGE AND BIRTH RATES.

The statistical tables devised and arranged for the Report on the Health of Manchester for the years 1891–93 present such a complete picture of the conditions of health in Manchester, so far as these can be represented by the figures usually handled by Medical Officers of Health, that I have adopted both the arrangement and the tables for setting out the annual statistics of this great City.

If, now, we refer to Table F in the Appendix, we find the marriage-rates, birth-rates, and death-rates given over an area nearly coincident with Manchester for the years 1871–1890, and for the present City of Manchester since 1891. From this table we observe that the marriage-rate, which very nearly corresponds in its course to the birth-rates of the two or three years following, reached its height in the years 1871–76, and then declined gradually till it reached its lowest point in 1888, when it again ascended slightly to revert to the same low point in 1893. In 1894 and 1895 it again ascended, being in 1895 higher than it had been in any previous year since 1884. In 1896 it reached the figure of 18·3 per 1,000, being the highest of any year since 1882.

There can be no doubt that an increased marriage-rate is a distinct symptom of prosperity affecting the mass of the population, partly immediate and partly potential, even if the essentials of the immediate and future prosperity may be difficult to make out. Two factors in the recent history of Manchester—viz., the gradual growth of shipping coming up the Ship Canal and the increasing importance of Manchester as a distributing centre—stand out in explanation of the improvement in the marriage-rate.

There are two ways in which the marriage-rate may be affected. In the first place it may be affected by the raising or lowering of the age at which people get married. In the second place it may be affected by the decrease or increase in number of the marriages which have taken place. Generally speaking, the two variations go together. When marriages increase they occur at lowered ages also, and conversely.

The variations in the birth-rate follow those of the marriage-rate, but not with absolute precision. Thus, in spite of the high marriage-rate of 1895, the birth-rate in 1896 is lower than it was in 1895. There can, in fact, be no

doubt that in some manner an afflux of well-being increases the number of births, mainly as the result of an increased marriage-rate, partly, however, by an independent impulse.

It is a very interesting question, What are the constituent factors making for prosperity which have the greatest influence in adding to population? There appears to be little doubt that a high infantile death-rate in an industrial district in which there appears to be a probability of continued employment has a stimulating effect on the production of children. The reason of this probably is that, when infants die at a high rate, the mothers are physiologically and otherwise set free to produce more children. This presupposes, of course, that the demand for the production of offspring is there, which it always is in a prosperous industrial centre, for reasons which it is not necessary to discuss at length. It must not be forgotten, at the same time, that, if the impulse to the production of children is in these circumstances so strong, the process through which the demand is satisfied in unhealthy districts entails great suffering, considerable blunting of the sensibilities, and much economical loss.

It is manifest, indeed, that to a poor family the birth, rearing, and burial of an infant even only six months old is a costly tax, apart altogether from the infinitely greater tax which such losses often inflict by the failing health and comparative incapacity of the mother.

That this loss is no necessary part of a high birth-rate may be at once seen by reference to Tables H and J in the Appendix.

Compare, for example, the district of Cheetham with one or two others of sufficient population, and having birth-rates not widely different :—

	Estimated population	Birth-rate per 1,000	Proportion of deaths under 1 year per 1,000 births
Cheetham	30,660	33·49	108
Central	36,584	31·22	205
Newton Heath.....	36,602	30·88	149
Openshaw.....	29,686	32·23	182
Hulme	71,978	32·79	186

It is necessary to observe, however, that in districts like the Central, where there is a large element of the lodger population, the birth-rate in proportion to the number of marriages may be disproportionately high, and that the figure 31·22 may give a very imperfect representation of the actual rate of legitimate reproduction.

In the Annual Report for 1895 I pointed out that, if we except St. George's, that portion of the City of Manchester which yields the highest proportion of new lives is a continuous area, which may be called an industrial area, containing Ancoats, Bradford, Beswick, Ardwick, West Gorton, and Openshaw. This year we may add the small district of Clayton, and then the same will be true for 1896.

Not only, however, is the production of new lives great, but such is the general prosperity of this City that the actual increment to the population is large over the whole of the above area, not even excepting Ancoats.

It will be found that it is in the other districts that the additions to the population are comparatively small, and more particularly in those districts in which the lodger element is considerable.

We are bound to infer, I think, that, so far as the means of rearing children is concerned, and so far as the inducements to reproduction go, the industrial community as a whole feel themselves fairly well situated. It is only right to add, however, that the children, when reared, form an important part of the prosperity of the industrial population.

What an immense saving in happiness and treasure it would be if the same increment could be attained with a lower birth-rate, and without the sacrifice of so many valuable lives.

In what, now, does the prosperity of the industrial community consist? What are the elements of which it may be said to be composed?

An artizan may be said to be well off who has good wages, good health, a cheap house, cheap food, cheap clothes, cheap fuel, and cheap luxuries.

Food includes cereals, meat, fish, vegetables, tea, and condiments. Luxuries may be taken to include tobacco, alcohol, and various conveniences.

Now, good wages spread over the community imply a period of buoyancy and production, and are subject to a certain amount of fluctuation. Good health depends partly on the nature of the occupation, partly on personal habits, and partly on the circumstances of the home. It cannot be said that the prosperity of the Manchester artizan rests on the good health which he enjoys. On the contrary, the comparatively bad health which he experiences devours a considerable portion of his prosperity. Then again, at present, it cannot be said that he has a cheap house. There is no doubt whatever that the demand for houses at present outstrips the supply, and that consequently houses are dear. This is probably one of the reasons why the increasing birth-rate has received a check.

Doubtless this will rectify itself in the direction, it may be hoped, of the establishment of working-class colonies outside the City, with easy means of access.

Tea and condiments are cheap, as indeed are all classes of food. It has been stated that a diminished price of wheat is accompanied, for the country generally, by a diminished marriage and birth rate. It is not easy to see why this should be so. A low price of wheat no doubt affects adversely the grain-growing parts of the country, and diminishes to some extent the wages of the labourer, while it prevents him sharing the general tendency to betterment felt elsewhere.

It affects, however, much more powerfully the numerous class indirectly dependent on the prosperity of the farmer, gathered mostly in small towns and villages. Per contra, to the extent to which the agricultural population live on cereals, the labourer has the advantage of cheap flour, while the feeding of horses and cows is also cheapened.

In discussing the effect on an urban community of the price of food, it has appeared to me that it would be well to have the facts before us.

These are approximately given, so far as the price of food is concerned, in the following table, which should be compared with the marriage and birth rates given in Table F :—

TABLE I.—Township of Manchester.—Prices paid by the Guardians for Flour, Butchers' Meat, and Coal; also the average Number of Persons in Receipt of Relief during the Years 1887–1895.

Year ending	Prices of Provisions					Pauperism		Birth-rate per 1,000
	Flour per Sack of 280lbs.	Butchers' Meat, per lb.			Coal, per ton	Average number of Paupers relieved in each week		
		Beef		Mutton	Engine	Indoor	Outdoor	
		Coarse	Fine					
1885	24/5 to 31/6	-/5	-/7½	-/7¾	6/10	8/7	3165	950	34·8
1886	25/2 to 31/8	-/4½	-/7	-/7	6/-	8/4	3234	1426	34·7
1887	25/2 to 30/6	-/3¾	-/6½	-/6½	5/6	8/4	3123	877	33·9
1888	24/- to 29/3	-/3¾	-/6½	-/6½	5/5	8/3	3130	713	33·3
1889	24/11 to 31/2	-/4½	-/6½	-/6½	5/8	8/7	3037	632	33·1
1890	24/9 to 29/11	-/5	-/7	-/7	7/-	9/9	2998	498	31·8
1891	27/3 to 28/11	-/4¼	-/6½	-/6½	8/8	11/2	3118	466	33·8
1892	26/4 to 28/5	-/4	-/6¼	-/6¼	7/6	10/2	3251	551	33·4
1893	21/8 to 25/1	-/3⅞	-/6¼	-/6¼	6/5	10/0	3277	586	33·4
1894	17/2 to 23/9	-/3¾	-/6	-/6	7/1	10/10	3328	395	31·8
1895	15/6 to 21/-	-/3¾	-/6	-/6	5/6	10/3	3343	618	33·4
1896	16/6 to 24/-	-/3⅝	-/5¾	-/5¾	5/7	9/1	3348	533	32·8

It will at once be seen that no relationship is observable between the price of flour in the last two or three years and the changes in the marriage-rate. So far as the cheapness of wheat, as a factor, is concerned, it is clear that its effect must be positive in raising the urban marriage and birth rates. But then, what causes the cheapness of wheat? Evidently a very abundant harvest in our chief fields of supply would have that effect, and it is difficult to see how that could have any other result than to assist in raising the urban marriage-rate both directly and indirectly by stimulating production. But wheat might be cheap for a quite different reason. Supposing, owing to any dislocation of the apparatus of barter—that is, of commerce—a curtailment to take place in the production of those materials which are most commonly, in the ultimate analysis, exchanged against wheat, then the corresponding class of materials would be raised in value as compared with wheat. That is to say, the price of wheat would be low, at the same time that there was a loss of wages in the urban producing trades. It would matter little whether such loss of wages occurred by curtailment of work or stoppages, or whether it was entailed by diminution of the rate of wages. Indeed the rate of wages, taken along with the amount of employment available, is the factor in urban communities which must determine the marriage and birth rates.

Even from the above table alone, we perceive that any adverse effect produced in 1896 by the increased price of flour is more than counterbalanced, in Manchester, by the cheaper price of mutton and house coal. When we further remember that as much money is now being spent on tobacco as on bread, what a large amount of any advance of wages is spent on alcohol, on dress, and on many other articles of use and luxury, we cannot but perceive that it is useless to attempt connecting the increase of the population with the price of cereals, so far, at any rate, as any direct effect on the well-being of the artizan is concerned.

The probabilities are, in fact, that a careful analysis of the various factors concerned in the cheapening of grain will lead us, not to the conclusion that cheap and abundant food checks reproduction, which is absurd, but rather to the result that any rapid cheapening of food may indicate bad trade, checked manufacture, agriculture for the time being outstripping the production of those articles against which it barters its produce.

I am not prepared, at present, to go more deeply into this question, which would lead us into very difficult economical problems.

The increase in the marriage and birth rates may be taken as a clear index of the improved circumstances of the community, from which we must work back to ascertain when such improvement has begun to act, and wherein it consists.

GENERAL MORTALITY STATISTICS.

Our calculations are all based on an approximate estimate of the population, calculated from the data of two previous censuses. In a district having but a small population, and subject to no marked vicissitude in its industrial conditions, such an estimate is sufficient for all practical purposes. That cannot, however, be said of great industrial centres, which are liable to rapid change. The growing prosperity of the Ship Canal and the increasing importance of the City as a distributing focus for goods from all parts of the world have been already mentioned in connection with the increase of prosperity, and must also be intimately associated with the growth of population.

As a matter of fact, houses empty at the last census have been filled, building operations are proceeding at an increased rate, and there is reason for believing that a tendency at present exists to the overcrowding of houses in the more thickly peopled parts of the City.

Now it is desirable, for many purposes, to have an accurate knowledge of the numbers and constituent elements of the population, and it would, therefore, be a very great advantage if we could have a census taken every five years.

It is not possible to state the amount of the increment which the population has received from the causes mentioned, and it would therefore appear best, meanwhile, to adopt the usual calculations, with the reservation that the birth, death, and marriage rates are all somewhat too high.

The death-rate for the year 1896 is calculated at 22·0 per 1,000, which is the lowest death-rate yet attained, with the exception of the remarkably low rate in 1894.

Again, however, we are obliged to deny ourselves that satisfaction from the diminution in our death-rate which we should have were it relative as well as absolute, since we find that the mortalities of Liverpool and Salford alone are higher than that of Manchester, and that only by a small amount, the mortality of Liverpool becoming practically the same when allowance is made for the difference in age constitution of the populations of the two cities.

In the Annual Report for 1895 I have pointed out that a considerable portion of the improvement in our recent death-rate must be ascribed to a low birth-rate following gradually on one previously high. Doubtless there are other influences at work, such as a greater diffusion of the wealth of the country over all ranks. The influence of education must be considerable, and, if only it led to a general condemnation of intemperance, would be of the utmost value. Whatever may be the causes of our reduced death-rates they are general in their operation over the country, and we but share in the results, though still in the rear.

TABLE 2.—Recorded and Corrected Death-rates per 1,000 Persons living in 33 Great Towns during the Year 1896.

Towns in the order of their Corrected Average Death-rates	Standard Death-rate	Factor for correction for Sex and Age distribution	Recorded Average Death-rate, 1896	Corrected Death-rate, 1896	Comparative Mortality Figure, 1896
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5
England and Wales	19·15	1·0000	17·10	17·10	1,000
England and Wales less the 33 Towns	19·45	0·9845	16·09	15·84	926
33 Towns	17·71	1·0813	18·91	20·45	1,196
Croydon	18·37	1·0424	14·22	14·82	867
Brighton	18·94	1·0110	16·13	16·31	954
Norwich	19·99	0·9579	17.38	16·65	974
Portsmouth	18·73	1·0224	16·57	16·94	991
Derby	17·36	1·1031	15·65	17·26	1,009
West Ham	17·75	1·0788	16·07	17·34	1,014
Bristol	18·33	1·0447	16·90	17·66	1,033
Leicester	17·64	1·0855	16·72	18·15	1,061
Swansea	17·53	1·0924	16·85	18·41	1,077
Cardiff	17·16	1·1159	16·84	18·79	1,099
Nottingham	17·81	1·0752	17·50	18·82	1,101
Bradford	16·73	1·1446	16·51	18·90	1,105
Plymouth	19·70	0·9720	19·57	19·02	1,112
Huddersfield	16·47	1·1627	16·47	19·15	1,120
Halifax	17·20	1·1133	17·33	19·29	1,128
London	17·97	1·0656	18·58	19·80	1,158
Hull	18·23	1·0504	18·91	19·86	1,161
Blackburn	17·05	1·1231	17·87	20·07	1,174
Burnley	16·67	1·1487	17·51	20·11	1,176
Newcastle	17·58	1·0892	18·46	20·11	1,176
Gateshead	17·83	1·0740	19·09	20·50	1,199
Leeds	17·28	1·1082	18·75	20·78	1,215
Sunderland	18·25	1·0493	19·82	20·80	1,216
Wolverhampton	18·30	1·0464	19·95	20·88	1,221
Birkenhead	17·42	1·0993	19·19	21·10	1,234
Sheffield	17·22	1·1120	19·26	21·42	1,253
Preston	17·42	1·0993	20·76	22·82	1,335
Birmingham	17·33	1·1050	20·81	23·00	1,345
Oldham	16·72	1·1453	20·27	23·22	1,358
Bolton	16·90	1·1331	20·73	23·49	1,374
Manchester	16·90	1·1331	21·99	24·91	1,457
Liverpool	17·44	1·0980	22·74	24·97	1,460
Salford	17·03	1·1244	22·64	25·46	1,489

Amongst the causes operative in sustaining a high mortality, it is only just to mention our Public Institutions, and especially the Manchester Union Hospital. There is, I think, no doubt that a number of poor people come into Manchester simply for the purpose of obtaining the advantage of treatment at Crumpsall in their last illness. To what extent other similar institutions operate I cannot say, but Crumpsall has a well-deserved reputation, and does, I think, undoubtedly act as a centre of attraction.

The relative position which Manchester occupies among the great towns of England and Wales may be seen from the table on page 7. In reading this table it is needful to recall that the corrected death-rates mean the death-rates which would have prevailed had the towns concerned had the same proportion of people at different groups of ages as holds for the whole of England and Wales. The correction is, in fact, solely for difference of age constitution.

Taking, now, the uncorrected death-rates, the last column gives the comparative mortality figure for Manchester. That is to say, it states the number of persons who have died in 1896 for every 1,000 who have been cut off in the country generally.

Low, comparatively to most other years, as is the death-rate in 1896, it is thus seen that the improvement has not kept pace with that prevailing elsewhere.

The comparative mortality figures are—

For	1891–93	1,424
„	1894	1,354
„	1895	1,450
„	1896 it is	1,457

What, now, are the causes of death in which we must locate the improvement which is manifest during last year?

It is assuredly not in the zymotic group of diseases.

If we take together the diseases measles, scarlet fever, diphtheria, membranous croup, enteric fever, smallpox, influenza, and whooping cough, the total number of deaths from all these causes in 1896 is greater than in any one of the four preceding years, the excess lying chiefly in measles, scarlet fever, and whooping cough.

We find also from Table F that the death-rate from diarrhœa, though somewhat lower than the average for the previous five years, was still over 1 per 1,000—a very high figure.

On referring to Table G, we perceive that the first decided improvement in 1896 is in deaths ascribed to tubercular diseases. It is true that the death-rate from phthisis—viz., 2·0 per 1,000—is slightly above that in 1894, the year of low mortalities. On the other hand, the death-rate from other tubercular diseases stands at the same low figure as in that year. It may be permitted us to hope that this is due to the strenuous efforts which have been made to instruct mothers in the necessity, under existing conditions, of boiling milk before giving it to infants. This is a genuinely sustained course of instruction, for the continuance of which we have to thank the District Registrars and the Ladies' Health Society.

The mortality ascribed to tabes mesenterica is, in 1896, 0·13 per 1,000, as compared with 0·18, the lowest previous figure in 1894; from other tubercular diseases it is 0·67, as compared with 0·67, the lowest figure in recent years.

The mortality from diseases of the nervous system is also lower than in any of the five previous years. Indeed, it is decidedly the lowest on record. Now the death-rate from nervous diseases is largely made up by deaths assigned to convulsions, a condition which is known to be intimately associated with infant feeding. We turn, then, to this cause of death, and find that the deaths under one year per 1,000 children born are as follows:—

1891	26·62	1894	13·85
1892	16·84	1895	11·86
1893	14·24	1896	10·52

It must be admitted, again, that whether we are justified or not in attributing part of this reduction to improvements in infant feeding, the figures do offer us some encouragement to continue our efforts.

From diseases of the circulation there is no improvement.

The death-rate from respiratory disease is, with the exceptions of 1884, 1889, and 1894, the lowest on record. It must be remembered, however, that influenza was not prevalent in 1896.

From Tables A, C, and L we obtain, by comparison of different years, a clear conception of our gains and losses in the past year. In the margin of Table L will be found a statement of the death-rates from the various causes there mentioned for the years 1891–95, by means of which we may enter up a column of gains and losses in 1896 as compared with the average of those years, as follows.

Gains and Losses in the Death-rate per 1,000 persons living in the year 1896 as compared with the average rate for the years 1891–95 :—

Gains.

Smallpox	0·03	
Diphtheria	0·17	
Enteric Fever	0·02	
Influenza	0·23	
Diarrhœa	0·10	
Erysipelas	0·03	
Puerperal Fever	0·02	
Rheumatic Fever	0·02	
Rickets	0·01	
Tabes Mesenterica	0·09	0·32
Hydrocephalus	0·11	
Scrofula, Tuberculosis	0·03	
Phthisis	0·09	
Old Age	0·04	
Brain and Nervous Disease	0·48	
Bronchitis	0·36	
Respiratory Disease	0·12	
Digestive	0·03	
Urinary	0·06	
Total	2·04	

Losses.

Measles	0·43
Scarlet Fever	0·11
Whooping Cough	0·02
Pyæmia	0·01
Cancer	0·04
Premature Birth	0·02
Pneumonia	0·11
Total	0·74

The chief losses are under measles and scarlet fever.

The gain noted under diphtheria is, no doubt, partly the result of altered nomenclature, the new method of examination having enabled us to define diphtheria with more precision. In spite of a gain being recorded under enteric fever, as compared with the average for the years 1891–95, it has to be recorded that, in spite of all our precautions, the death-rate is higher than it was in 1894 or 1895.

The advance made under tuberculous disease I have already mentioned, as well as that under the heading of nervous disease.

The losses sustained under measles and scarlet fever are grievous, especially the former. It indicates, what indeed must be acknowledged, that our efforts to reach this disease through the schools have so far proved unsuccessful. This subject I will discuss under the heading of "Measles."

Singularly enough there is a loss under the heading of pneumonia, in spite of the small amount of influenza in 1896.

Nevertheless, the aggregate gain under influenza and respiratory disease amounts to 0·60 per 1,000—that is to say, to over 296 lives.

I would once more call attention to the gain under puerperal fever, erysipelas, and pyæmia, small truly in itself, but, if genuine, of great moment to lying-in women. It is much to be hoped that these figures represent the facts. It would be a misfortune to have misleading statistics in a matter of such vital importance to the community as this.

It will thus be seen that a gain amounting to 0·26 is left unaccounted for, distributed amongst a number of smaller items.

The gains and losses are mostly small, but they are not always without importance on that account.

To obtain an idea of the individual figures, we may remember that a gain of 0·22 represents the saving of 119 lives.

The chief items of gain in the year's budget, then, are under the titles of diphtheria, influenza, diarrhœa, tuberculous disease, brain and nervous diseases, bronchitis, and other respiratory disease.

DEATH-RATES AT GROUPS OF AGES.

Let us now consider the mortalities for the whole City at different groups of ages.

First, I would mention a difficulty which I have experienced in regard to comparing our mortalities at different age groups with those holding in other towns. Each town selects its own age groupings, and, there being no uniformity, no comparison is possible of the mortalities at different periods of life. Now this comparison is precisely what we want in order to enable us to see where our principal weaknesses lie. We need to be able to compare the death-rates at groups of ages, and, for certain selected representative diseases, the death-rates at those ages at which they chiefly occur. It would thus be of very great advantage if the different towns would agree to select certain age groups which should be the same for all, and to calculate the death-rates which I have mentioned.

So great are the variations in mortality from one year to another, variations which extend over the whole country, that it is of comparatively little value to seek for the special sources of high mortality by comparing the mortalities in age groups for Manchester with similar mortalities in other parts of the country for different years or different periods.

What we require, to enable us to ascertain from time to time how we stand as compared with other towns, is table such as the following, which shall include other towns :—

TABLE 3.—Death-rates, per Thousand Living, in Groups of Ages for the Years 1894 and 1895 for England and Wales, London, and Manchester.

1894	All Ages	0–	5–	10–	15–	20–	25–	35–	45–	55–	65–	75–	85 and upwards
England and Wales	16·6	50·7	4·2	2·4	3·7	4·8	6·4	10·2	15·6	28·5	57·3	121·1	228·0
London	17·4	60·6	5·2	2·3	3·3	4·2	6·3	11·3	18·2	30·5	57·1	114·5	205·6
Manchester	19·8	64·9	4·9	2·8	4·1	5·0	8·4	15·0	22·6	42·9	87·0	176·2	227·9
Per centage excess over England generally	19·3	28·0	16·7	16·7	10·8	4·2	31·3	47·1	44·9	50·5	51·8	45·5	...
Over London	13·8	7·1	...	21·7	24·2	19·1	33·3	32·8	24·2	40·6	52·4	54·0	10·8

TABLE 4.

1895	All Ages	0–	5–	10–	15–	20–	25–	35–	45–	55–	65–	75–	85 and upwards
England and Wales	18·7	59·0	4·0	2·4	3·7	4·9	6·5	10·5	16·9	32·7	65·8	149·0	286·6
London	19·5	67·4	4·7	2·5	3·2	4·1	6·6	11·9	19·9	36·3	69·4	151·2	281·9
Manchester	24·5	87·7	5·9	3·0	4·4	6·0	8·8	16·4	27·7	51·9	95·5	224·9	327·2
Per centage excess over England generally	31·0	48·6	47·5	25·0	18·9	22·4	35·4	56·2	63·9	58·7	45·1	50·9	14·2
Over London	25·6	30·1	25·5	20·0	37·5	46·3	33·3	37·8	39·2	43·0	37·6	48·7	16·1

TABLE 5.—1894.—Death-rate of Selected Diseases in Six Age Groups.

DISEASES	25 to 35 Years						35 to 45 Years						45 to 55 Years					
	England&Wales		London		Manchester		England&Wales		London		Manchester		England&Wales		London		Manchester	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Influenza	511	0·11	77	0·10	6	0·07	599	0·17	76	0·14	5	0·08	754	0·29	109	0·29	5	0·11
Enteric Fever	1,026	0·23	179	0·24	22	0·26	588	0·17	87	0·16	10	0·15	332	0·13	44	0·12	4	0·09
Diarrhœa	54	0·01	4	0·01	3	0·03	90	0·03	11	0·02	3	0·05	124	0·05	13	0·03	4	0·09
Chronic Alcoholism	220	0·05	55	0·07	10	0·12	429	0·12	118	0·22	16	0·24	449	0·17	107	0·28	11	0·24
Cancer	648	0·14	146	0·20	11	0·13	2,235	0·65	426	0·80	52	0·80	4,631	1·79	853	2·24	103	2·28
Phthisis	10,060	2·22	1,759	2·37	277	3·22	9,094	2·64	1,885	3·51	275	4·22	6,009	2·32	1,308	3·44	165	3·66
Apoplexy and Hemiplegia	380	0·08	56	0·08	14	0·16	1,086	0·31	172	0·32	25	0·38	2,756	1·06	408	1·07	68	1·51
Endocarditis, Valv: Disease, and Unclassified Circulatory System	2,130	0·47	352	0·48	53	0·62	3,570	1·03	623	1·16	119	1·82	5,560	2·15	784	2·06	115	2·55
Bronchitis	458	0·10	102	0·14	23	0·27	1,058	0·31	215	0·40	57	0·87	2,532	0·98	530	1·39	106	2·35
Pneumonia	1,731	0·38	275	0·37	69	0·80	2,442	0·71	394	0·73	90	1·38	2,662	1·03	416	1·09	106	2·35
Nephritis and Bright's Disease	805	0·18	134	0·18	20	0·23	1,248	0·36	244	0·45	31	0·46	1,657	0·64	325	0·85	35	0·77
Digestive System	1,393	0·31	242	0·33	32	0·37	2,126	0·62	356	0·66	48	0·74	2,992	1·16	524	1·38	58	1·29

TABLE 5.—*Continued*—1894.

DISEASES	55 to 65 Years						65 to 75 Years						75 to 85 Years					
	England&Wales		London		Manchester		England&Wales		London		Manchester		England&Wales		London		Manchester	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Influenza	1,040	0·61	108	0·47	11	0·44	1,324	1·29	130	1·03	4	0·37	869	2·47	58	1·43	2	0·89
Enteric Fever	196	0·11	23	0·10	8	0·32	73	0·07	9	0·07	...	...	9	0·03	2	0·05	...	...
Diarrhœa	242	0·14	27	0·12	15	0·60	470	0·46	48	0·38	19	1·74	434	1·24	52	1·29	6	2·68
Chronic Alcoholism	248	0·14	50	0·22	11	0·44	94	0·09	18	0·14	2	0·18	18	0·05	1	0·02	...	...
Cancer	5,901	3·44	984	4·30	94	3·77	5,331	5·20	752	5·93	67	6·15	2,078	5·91	265	6·55	10	4·46
Phthisis	3,130	1·82	578	2·53	73	2·93	1,087	1·06	210	1·66	19	1·74	165	0·47	31	0·77	1	0·45
Apoplexy and Hemiplegia	5,110	2·98	559	2·44	105	4·22	7,297	7·11	816	6·44	119	10·92	4,819	13·71	497	12·29	31	13·83
Endocarditis, Valv. Disease, and Unclassified Circulatory System	8,555	4·98	985	4·31	169	6·79	10,780	10·51	1,039	8·20	123	11·28	5,459	15·54	482	11·92	37	16·50
Bronchitis	5,242	3·05	967	4·23	160	6·42	8,123	7·92	1,294	10·21	180	16·55	6,313	17·97	947	23·41	81	36·13
Pneumonia	2,723	1·59	380	1·66	86	3·45	2,393	2·33	345	2·72	49	4·50	1,179	3·36	164	4·05	23	10·26
Nephritis and Bright's Disease	1,921	1·12	315	1·38	33	1·33	1,672	1·63	255	2·01	30	2·75	610	1·74	86	2·13	5	2·23
Digestive System	3,606	2·10	468	2·05	62	2·49	3,534	3·44	443	3·50	44	4·04	1,753	4·99	208	5·14	15	6·69

TABLE 6.—1895.—Death-rate of Selected Diseases in Six Age Groups.

DISEASES	25 to 35 Years						35 to 45 Years						45 to 55 Years					
	England&Wales		London		Manchester		England&Wales		London		Manchester		England&Wales		London		Manchester	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Influenza	786	0·17	119	0·16	30	0·35	1,048	0·30	178	0·33	29	0·44	1,408	0·54	286	0·74	28	0·62
Enteric Fever	1,157	0·25	182	0·24	18	0·21	665	0·19	67	0·12	15	0·23	370	0·14	45	0·12	4	0·09
Diarrhœa	74	0·02	8	0·01	3	0·03	129	0·04	14	0·03	6	0·09	192	0·07	17	0·04	9	0·20
Chronic Alcoholism	206	0·04	55	0·07	2	0·02	519	0·15	127	0·23	14	0·21	505	0·19	110	0·29	16	0·35
Cancer	697	0·15	153	0·20	12	0·14	2,386	0·68	452	0·83	42	0·64	4,859	1·86	889	2·31	90	1·98
Phthisis	10,329	2·25	1,889	2·52	277	3·19	9,282	2·66	1,978	3·65	311	4·73	6,228	2·38	1,380	3·59	179	3·93
Apoplexy and Hemiplegia	410	0·09	57	0·08	13	0·15	1,106	0·32	175	0·32	36	0·55	2,730	1·04	383	1·00	66	1·45
Endocarditis, Valv: Disease, and Unclassified Circulatory System	2,123	0·46	376	0·50	61	0·70	3,773	1·08	676	1·25	126	1·92	6,164	2·36	937	2·44	164	3·60
Bronchitis	548	0·12	112	0·15	26	0·30	1,412	0·40	331	0·61	65	0·99	3,543	1·35	802	2·09	170	3·74
Pneumonia	1,814	0·40	279	0·37	86	0·99	2,560	0·73	380	0·70	137	2·08	2,891	1·11	437	1·14	154	3·39
Nephritis and Bright's Disease	813	0·18	139	0·19	19	0·22	1,283	0·37	241	0·44	28	0·43	1,825	0·70	356	0·93	48	1·06
Digestive System	1,491	0·33	238	0·32	25	0·29	2,126	0·61	348	0·64	52	0·79	3,222	1·23	556	1·45	70	1·54

TABLE 6—*Continued*—1895.

DISEASES	55 to 65 Years						65 to 75 Years						75 to 85 Years					
	England&Wales		London		Manchester		England&Wales		London		Manchester		England&Wales		London		Manchester	
	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate	Deaths	Rate
Influenza	2,119	1·22	350	1·51	33	1·31	2,689	2·59	415	3·24	26	2·36	1,972	5·55	297	7·27	12	5·30
Enteric Fever	194	0·11	25	0·11	1	0·04	78	0·08	4	0·03	3	0·27	14	0·04	1	0·02	...	...
Diarrhœa	434	0·25	41	0·18	9	0·36	807	0·78	75	0·59	19	1·73	795	2·24	78	1·91	9	3·98
Chronic Alcoholism	287	0·17	59	0·26	6	0·24	109	0·11	18	0·14	3	0·27	19	0·05	4	0·10	...	...
Cancer	6,511	3·75	988	4·28	97	3·86	5,563	5·36	774	6·05	65	5·91	2,218	6·25	330	8·08	16	7·07
Phthisis	3,275	1·89	667	2·89	80	3·19	1,120	1·08	200	1·56	22	2·00	145	0·41	26	0·64	...	...
Apoplexy and Hemiplegia	5,469	3·15	646	2·80	118	4·70	7,949	7·67	841	6·57	106	9·64	5,564	15·67	555	13·59	54	23·86
Endocarditis, Valv. Disease, and Unclassified Circulatory System	9,859	5·68	1,199	5·19	195	7·76	11,968	11·54	1,275	9·96	145	13·19	6,484	18·26	659	16·13	51	22·54
Bronchitis	7,543	4·35	1,458	6·31	253	10·07	11,319	10·92	2,029	15·85	250	22·73	8,779	24·72	1,470	35·98	96	42·42
Pneumonia	3,139	1·81	456	1·97	124	4·94	2,760	2·66	406	3·17	84	7·64	1,384	3·90	197	4·82	24	10·61
Nephritis and Bright's Disease	2,173	1·25	379	1·64	41	1·63	1,947	1·88	301	2·35	20	1·82	801	2·26	108	2·64	4	1·77
Digestive System	3,672	2·12	497	2·15	54	2·15	3,556	3·43	483	3·77	26	2·36	1,793	5·05	206	5·04	15	6·63

It will be seen from Tables 3 and 4, on page 12, that the excess of mortality prevailing in Manchester as compared with the rest of the country and with London, although present at all periods of life, is much more marked at the later periods, becoming specially prominent after the age of 25. It would thus appear that the unfavourable conditions which prevail here affect especially the adult population, and we may, with this knowledge already gained, go on to discover in what class of diseases it is that the excess is most particularly shown.

It will be at once seen that if the corresponding figures for a few representative towns can be obtained, it should be possible, so to speak, to track down the manner in which this population is more specially assailed by disease.

Let us now apply this to an examination of the differences in mortality rates between Manchester, all England, and London from certain selected diseases at those periods of life in which the tables have shown the greatest difference to lie. We will take the years 1894 and 1895. The figures are given for selected diseases in Tables 5 and 6, on pages 13–16.

Examining first the figures for the year 1894, we find that the death-rates at the selected groups of ages from *influenza* are lower in Manchester than in either England and Wales or London.

From *enteric fever* the relation fluctuates. In that year, however, the mortality from this disease in Manchester was low.

From *diarrhœa* the mortalities are much the highest in Manchester, being more than double those for the rest of the country or for London.

The mortalities from cancer bear to each other a varying relationship.

From phthisis at each age group, except 75–85, the death-rates are highest in Manchester, the excess being particularly notable at ages 25–35.

From apoplexy and hemiplegia—that is, from brain failure, there is a marked excess in Manchester at all ages, and particularly at the ages 45 to 75, when the death-rate from this group of diseases is a serious element in the mortality.

The same is true of *diseases of the circulation*, with which the previous group is closely associated.

It is, however, under the headings bronchitis and pneumonia that the greatest differences are perceived, the death-rate for Manchester in each age group from bronchitis being more than double that of England and Wales generally, and enormously in excess of the death-rates in London. The same, with an insignificant exception, is true of pneumonia.

It is, thus, in diseases of the lungs that the mortalities of Manchester stand out most sharply from those prevailing over the country generally, and from those holding also in London.

These last four groups of disease are not unconnected, since diseases of the chest are largely concerned in the production of circulatory disease, and circulatory disease is largely concerned in the production of apoplexy.

If, further, we consider the length of time over which these diseases extend, when the person attacked is concerned, we perceive that apart altogether from death, the money loss sustained from such an excess of disease must be very great.

Under *diseases of the kidney* the relations vary.

From *diseases of the digestive system*, again, the mortality in Manchester is highest after the age of 35.

I have included in this table the death-rates from chronic alcoholism, which, as between Manchester and London, show a varying relationship. No true picture is, however, thus obtainable of the effects of alcohol, since it is only exceptionally that a death would be certified as due to "chronic alcoholism."

Turning now to 1895, let us see how the death-rates there compare with those for 1894.

The death-rates from influenza at the earlier ages is now highest in Manchester. Substantially, however, the position is the same.

The same is true of enteric fever.

The relationship is also the same for diarrhœa.

We may, in fact, go through the causes of death one by one and scarce a word requires to be altered, except under diseases of the digestive system, in which the relationship proves inconstant.

We may, therefore, infer that successive comparisons would probably have the same results, viz., that the chief excess of mortality in Manchester falls under respiratory diseases.

There is, however, also, a steady and marked excess under diseases of the circulation, brain failure, phthisis, and diarrhœa.

It has been stated that, in a comparison with other centres of population, we must make the comparison between the death-rates at corresponding age groups in the same year, or for the same groups of years, if we are to expect conclusions of any value. But it is not without utility, in estimating the influences at work in a given year, to compare the death-rates at groups of ages with the corresponding death-rates at some standard period. This has been done in the following table, which affords a comparison for Manchester between 1896 and the five years 1891-95, also between Manchester in those periods and the whole country in 1881–90.

TABLE 7.—Annual Rates of Mortality in Manchester in the Year 1896 at Twelve Groups of Ages amongst Persons, Males and Females, compared with the Average Rate at those ages in Manchester 1891–1895, and England and Wales during the Decennium 1881–90.

	Persons			Males			Females		
	Manchester Average, 1891–1895	Manchester, 1896	England and Wales, 1881–90	Manchester Average, 1891–1895	Manchester, 1896	England and Wales, 1881–90	Manchester Average, 1891–1895	Manchester, 1896	England and Wales, 1881–90
All Ages	22·93	21·99	19·17	24·59	23·84	20·28	21·39	20·27	18·06
0—	78·60	75·92	56·77	84·68	79·75	61·59	72·65	72·18	51·95
5—	5·67	4·95	5·31	5·45	5·11	5·35	5·88	4·80	5·27
10—	2·94	2·64	3·04	3·10	2·67	2·96	2·79	2·61	3·11
15—	4·40	4·58	4·38	4·82	5·45	4·33	4·01	3·75	4·42
20—	5·65	5·06	5·64	6·01	5·96	5·73	5·34	4·27	5·54
25—	8·89	7·88	7·20	9 26	8·97	7·78	8·55	6·86	7·41
35—	16·24	15·59	11·51	18·26	19·02	12·41	14·31	12·33	10·61
45—	26·24	25·51	17·23	30·09	31·68	19·36	29·46	20·01	15·09
55—	49·38	47·33	31·57	54·68	53·66	34·69	45·10	42·22	28·45
65—	95·41	91·74	65·38	109·89	100·02	70·39	85·47	86·05	60·36
75—	202·75	207·15	138·88	233·13	215·03	147·14	184·72	202·47	130·62
85—	292·42	320·00	288·32	321·49	319·44	305·81	278·63	320·26	270·82

From the first comparison, which includes both sexes, we perceive that at all ages, except 15–20, the death-rate in 1896 is decidedly below that in the preceding five years 1891–95, notwithstanding the high zymotic death-rate of last year. When we compare the death-rates with those of England and Wales for 1881-90, we perceive that, though at school ages the mortality is smaller than that of the country generally, yet both in childhood and at the ages above 15 it is much higher, corresponding with what we have already learned by the more accurate comparison of the same years.

When, now, we make the same comparison for males and females separately, we find that for females at every age group but one the mortality is much less for Manchester in 1896 than in the years 1891–95, while amongst males it is greater at certain ages, viz., from 15 to 20, from 35 to 45, and from 45 to 55.

This general reduction of death-rates inclines us to believe that, as was the case in 1894, the reduction is due mostly to climatic influences, however these may have operated, the more so that a similar favourable influence has been felt by the whole country.

To descend to particulars, we find that the infant mortality—viz., 176 deaths per 1,000 children born during the year—is less than in Plymouth, Wolverhampton, Birmingham, Leicester, Birkenhead, Salford, Oldham, and Preston.

The percentage of illegitimate births in 1896 was 4·21, which is higher than in 1892 and 1893, but lower than in 1891, 1894, and 1895.

The mortality amongst these unfortunate infants is so excessive that this percentage is by no means a matter of indifference, and we must consider, therefore, the infant mortality in 1896 as favourable, especially when we find that the percentage of illegitimacy in the Manchester Township, in which part of the City infant mortality is always high, is the same as in 1894, and is higher than in any of the years 1891–93 and 1895.

From Table E in the Appendix we obtain a figure picture of the conditions from which infants and young children die. One of the most prominent causes in the first three months of life is immaturity, of which 317 die. This number is about the same as in previous years, excepting 1894, when the number was only 231.

The deaths classified as from "atrophy and marasmus" are for that age 327, which is by no means a low figure.

On the other hand, the deaths assigned to convulsions are 121, which is decidedly small for Manchester. I have already said that there is some reason for connecting this reduction with better methods of feeding, an explanation which may seem to sort ill with the preceding fact. Boiling milk, however, may destroy certain injurious infective processes in the milk, and

yet not improve its nutritive properties, as assuredly it will not avert the consequences of errors in diet unconnected with milk. Then again, the terms "atrophy and marasmus" cover, no doubt, a proportion of perfectly distinct diseases.

Diarrhœa is responsible for 114 deaths, and lung diseases for 136, neither of which figures differs much from the average.

In the next three months of life the mortality from diarrhœa rises to 157, while that from lung diseases is the same. From wasting conditions it is now 118.

From six to twelve months the number of deaths ascribed to diarrhœa diminishes, while from lung diseases it increases.

The measles mortality in 1896 reaches its maximum (viz., 117) at this age; but this is a very unusual relation, the mortality being usually greatest in the second year of life. From whooping cough the number of deaths is now 79, and this disease, as usual, has reached its maximum.

The number of deaths ascribed to syphilis is greatest during the first three months of life. It is to be feared, however, that the figures given do not represent the actual number of deaths from this cause. From tuberculosis and scrofula the deaths steadily increase up to the end of the first year. Many of these deaths, however, are, doubtless, not tuberculous in their nature. Lung diseases now exact the heavy mortality of 308 deaths.

The total deaths under one year of age reach the high figure of 3,115.

In the second year of life, measles in 1896 exacted the very heavy total of 194 lives. The mortality from whooping cough was at this age 111. The deaths from lung diseases are still very numerous, reaching a total of 322. In the third year of life the chief causes of death are measles, whooping cough, and lung diseases; in the fourth year they are measles, scarlet fever, and lung diseases; in the fifth, measles, scarlet fever, and lung diseases.

If the recapitulation of these figures seems tedious, their significance cannot fail to arrest attention. There cannot be any doubt that the diarrhœal mortality, which in 1893 and 1895 was double that of London, is largely due to maternal ignorance, combined with the presence of filth conditions about the houses.

The terrible mortality from marasmus is the result largely of ignorance, combined with dirt.

The great fatality from lung diseases, measles, and whooping cough is the result of bad clothing, insanitary conditions, and ignorant handling.

The deaths from convulsions are largely due to bad methods of feeding,

One of the first things to be taught to girls in our schools is how to feed and clothe a young child. The garments of a young child cannot be too clean, and they should be of woollen material. A good, clean, dry, woollen garment means warmth, which again means food to a young child. Really good woollen garments are most economical materials for a young mother to have, if kept clean. It must always be remembered that an infant will be certain to stuff its clothes into its mouth, and if the clothing is not kept scrupulously clean it will be liable to diarrhœa and other troubles even if other matters are attended to. Then, again, a woollen garment is an ideal non-conductor of heat, so long as it is clean and dry. Hence it is vital to an infant suffering from measles or whooping cough to have clean woollens on. This is also of vital importance in the prevention of lung disease. The most important things, then, to instil into girls in handling infants is the necessity for rational feeding and the extreme importance of clean, dry, woollen garments to cover the whole body. I have to acknowledge valuable aid from the Ladies' Health Society in the instruction of mothers in these cardinal principles.

Referring now to Table M in the Appendix, we find that at ages under 5 years, the year 1896 shows a heavy mortality from measles, scarlet fever, and whooping cough. From measles it wears a particularly threatening aspect, inasmuch as it extends over the two years 1895 and 1896, and has been continued with considerable severity into 1897. In 1896 it shows a tendency also to pass beyond the ages to which it is usually more specially confined, and, assuredly, there is cause for close attention.

From diarrhœal diseases the death-rate, though high, is below the average.

On the other hand, there is a distinct diminution in the mortalities from tubercular disease, from brain disease, and from diseases of the lungs.

From diseases of the digestive system also there is a diminution, though less marked.

At the ages 5–15, scarlet fever yields a higher mortality than in any of the years 1891–95. The measles death-rate is above the average.

From tubercular disease, again, the death-rate is the lowest of the six years 1891–96. The mortality is also lower than usual from diseases of the brain and lungs.

At the adolescent ages, 15–25, enteric fever assumes importance, and is slightly in excess of the average of 1891–95. Tubercular disease is increasing, and is now the most important individual cause of death, causing more than one-third of all deaths. The death-rate from this cause is the same as in 1893, and is less than that in the other four years. From diseases of the brain it is below the average. From heart disease it is the highest of the six years. The same is true with regard to lung disease.

At the ages 25–45 the enteric fever death-rate is below the average. Tubercular disease is still the principal cause of death, and produces nearly one-third of the deaths. The mortality is, from this cause, the lowest of the six years 1891–96. The deaths from diseases of the brain are fewer than in any of the years 1891–95. From disease of the heart the death-rate at this age is less than the average. The death-rate from lung disease is above the average.

At 45–65 tubercular disease, though positively of more, is relatively of less importance. The death-rate at this age is about the average. From diseases of the brain it is decidedly less than in each of the years 1891–95. From diseases of the heart it is somewhat under the average. Lung disease has now assumed a very preponderating position. The death-rate from this cause is less than in any recent year except 1894.

At ages above 65 the chief causes of death are diseases of the brain, heart, and lungs, from which the mortality is under the average of the six years.

On the different divisions of the City.

If we refer to Table J in the Appendix, we find that the illegitimate birth-rate is unusually high in the Central Division of the City, and that it is very much higher in South Manchester than in North Manchester. Indeed the remarkable difference which that table reveals between the Central and Southern Divisions, which we may class together in this connection, and North Manchester, may be seen, on reference to previous reports, to extend through the last few years. It is, of itself, an index that the population of the first-named divisions contains elements which do not exist in the Northern Division, and which help to raise the death-rate in the former, One chief element may be described as being unstable and fluctuating, without more precisely defining it. As usual, the death-rate of illegitimate children is disproportionately high, being in each division more than double that of legitimate births.

Last year I remarked on the excessive illegitimacy shown by the statistics in certain districts, notably in the Central District of the Manchester Township, in Crumpsall, and in Chorlton-on-Medlock.

The rate is much lower for Crumpsall than it was last year, but still exceeds that of any other district in the Northern Division.

The illegitimate deaths occurring in institutions in the Central District and in Chorlton have been distributed for 1896. But, in spite of this, the rates are higher in these than in other districts of the City. It is possible that some factors in the production of the high illegitimate death-rate have been overlooked. But it is also possible that the facilities, the necessary facilities, in these districts for the reception of lying-in women have tended to increase illegitimacy in their neighbourhood.

The death-rates in the three divisions of the City are—for Manchester Township, 28·7; South Manchester, 20·4; North Manchester, 17·8. This is a striking contrast. We have side by side three populations, one of which, year by year, exhibits a death-rate which everyone feels to be a reproach; a second shows a death-rate far in excess of nearly all towns; and the third may be placed among the better-class towns. It might be supposed by an outsider that North Manchester was the abode of the well-to-do citizen. Such is very far from being the case, although it is true that element enters into the population of this part of the City.

It is evident that there are some profound differences in the circumstances of these populations.

The first clear difference is density of population. The Manchester Township is denser than South Manchester, and South Manchester than North Manchester, in a very great degree, as may be seen from Table H in the Appendix. That will not suffice, however, to explain the terrible death-rate in the heart of the City.

The Manchester Township, again, is the region of lodging-houses. Further, it is the oldest part of the City, and many of the houses are back-to-back, while many are overshadowed by neighbouring buildings, are badly ventilated, and are otherwise insanitary.

Such are some of the elements which go to make the difference.

The preponderant unfavourable circumstance in South Manchester is the manner in which the houses are crowded together, with only narrow intervals at the back of the houses, in which the atmosphere is rendered heavy and impure by defective pail-closets and middens.

The birth-rate is considerably the highest in the Manchester Township, and it is so year by year. It is, however, next highest not in South Manchester, but in the Northern Division.

The natural increase of the population, obtained by subtracting the birth-rate from the death-rate, is highest in North Manchester, considerably less in South Manchester, and again much the least in the Manchester Township.

The difference in the death-rates of the outlying districts and of the more central parts of the City does not, however, represent the whole difference in the health conditions.

When, as in the following table, the death-rates have been calculated out on the supposition that the proportion of persons living in the different districts is the same for selected groups of ages—that is to say, when the death-rates have been corrected for age distribution—we find that the discrepancy becomes much greater. The death-rate in each district of the

Central Division then becomes more than double that of Cheetham and Crumpsall, and the difference between the death-rate in the different portions of the City and that prevailing throughout the country becomes intensified.

TABLE 8.—1896.—RECORDED AND CORRECTED DEATH-RATES

PER 1,000 PERSONS LIVING.

Groups of Civil Parishes in the Sub-Districts of Manchester, arranged in order of their corrected Death-rates	* Standard Death-rate	† Factor for correction for Sex and Age Distribution	Recorded Death-rate, 1896	‡ Corrected Death-rate, 1896	§ Comparative Mortality Figure
Cheetham and Crumpsall	17·91	1·0693	14·57	15·58	911
Moston	17·72	1·0807	17·24	18·63	1,090
Blackley and Harpurhey	17·16	1·1157	18·04	20·13	1,177
Newton Heath, Bradford, Beswick, and Kirkmanshulme	17·08	1·1211	19·02	21·33	1,247
Ardwick, Openshaw, West Gorton, and Rusholme	16·81	1·1374	19·45	22·13	1,294
Clayton	17·71	1·0815	21·23	22·96	1,343
Chorlton-upon-Medlock	16·29	1·1755	20·02	23·54	1,377
Hulme	16·93	1·1309	22·51	25·46	1,489
St. George's	16·89	1·1340	28·57	32·40	1,895
Ancoats	16·83	1·1381	29·20	33·23	1,943
Central	16·25	1·1782	28·28	33·32	1,949
England and Wales	19·15	1·0000	17·10	17·10	1,000

Table L enables us to estimate for a number of important diseases the differences in the mortalities.

Comparing the Manchester Township with South Manchester, we find that the death-rate is higher in the former from measles, whooping cough,

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* The standard death-rate signifies the death-rate at all ages calculated on the hypothesis that the rates at each of twelve age periods in each town were the same as in England and Wales during the ten years 1881-90, the death-rate at all ages in England and Wales during that period having been 19·15 per 1,000.

† The factor for correction $\left\{=\frac{19{\cdot}15}{\text{Standard death-rate}}\right\}$ is the figure by which the recorded death-rate should be multiplied in order to correct for variations of sex and age distribution.

‡ The corrected death-rate is the recorded death-rate multiplied by the factor for correction.

§ The comparative mortality figure represents the corrected death-rate in each group of civil parishes compared with the recorded death-rate at all ages in England and Wales in 1896 taken as 1,000.

enteric fever, influenza, diarrhœa, erysipelas, pyæmia, phthisis, premature birth, old age, brain and nervous diseases, heart diseases, bronchitis, pneumonia, the digestive organs, and the urinary organs. In fact, all the important *indicia* of good or bad health declare that the conditions of life are worst in the centre of the City.

In only one important group of diseases is the position quite reversed. Although the death-rate from phthisis in the Manchester Township is nearly double that in South Manchester, the death-rate from other groups of tuberculous disease is lowest in South Manchester. The meaning of this seeming anomaly is, no doubt, partly this: that a large portion of the phthisical death-rate in the Manchester Township is imported, and is not generated in Manchester, but consists of people who stay in the City to qualify themselves for Crumpsall Workhouse. Of still greater importance, however, is the consideration that a large proportion of the deaths from phthisis in the Township occur in adults, who do not come into intimate contact with children, and, therefore, do not infect them.

From cancer, also, the death-rate is highest in South Manchester.

When we compare the Manchester Township with North Manchester, we find that the same difference exists in regard to all the typical conditions already mentioned—usually in a more marked form.

Only from pyæmia and puerperal fever are the rates somewhat higher in North Manchester. From phthisis the death-rate is only 1·19 per 1,000, as against 3·12 in the Manchester Township. From other forms of tuberculosis also the death-rate is lower in North Manchester.

I have said that the conditions enumerated are important *indicia* of health. Enteric fever and diarrhœa are intimately associated with filth conditions. I have shown that death from whooping cough is intimately associated with insanitary conditions of the house. The same is true of measles. It is also true of respiratory disease. Some conditions, such as an excessive death-rate from heart disease, may also be due partly to excessive strain, and perhaps to inability on the part of the adult population to obtain necessary rest. But some of these conditions may also be due partly to excessive indulgence in alcohol, which plays a decided part in the production of disease, whether classed as digestive, urinary, respiratory, or cardiac.

Death-rates from epidemic diseases such as measles and influenza are, however, not susceptible of such exact statement, as they may be experienced in excess only in one part of the City.

Amongst the influences which sustain the high death-rate of Manchester, high relatively even when it is not so high absolutely, must be mentioned the insanitary condition of the Manchester Township, with its old, damp, dark dwellings, as well as its numerous crowded and unsuitable lodging-houses, and the influx of the ailing poor into Manchester. Both in the older parts of

Manchester and in the outskirts the arrangements for the removal of excreta must exert an important effect on the mortality, as, indeed, the instances of Bradford and West Gorton clearly show.

This, added to the manner in which new houses were formerly crowded together, has unquestionably had much to do with the death-rate.

Not only so, but the conditions of the drainage in the back passages has been, generally speaking, very bad.

Both the soil and the air in the rear of the houses over considerable portions of the City have thus been rendered impure, with results which have been well recognised in the sanitary history of this country.

These conditions have roused a corresponding degree of activity in many sanitary reformers; but perhaps the most powerful ameliorative influence in Manchester has been the charity which has bestowed on the City with an ungrudging hand so many noble institutions for the healing of the sick poor. As many as 19·2 per cent. of all deaths in 1896 occurred in public institutions, a proportion exceeded only in 1895. (See Table 9.)

Tuberculous disease is favoured by a variety of conditions. Any and every circumstance which depresses physical well-being, whether it consists in external causes—such as want of light, want of fresh air, overcrowding, dirt, want of good clothing, want of fuel, inferior food, excess, or mental distress—helps to render the infection of consumption potent for harm. There is, therefore, no surer index than phthisis of a complex of unfavourable influences, though it does not help us to separate them. Of this, however, we may be sure, that where phthisis is rife there conditions exist urgently calling for remedy, more especially overcrowding under unfavourable circumstances.

If, now, we compare North Manchester with South Manchester, we find that the death-rates are lower in the former from scarlet fever, whooping cough, enteric fever, diarrhœa, cancer, tuberculous disease in all its forms, old age, brain and nervous diseases, heart disease, bronchitis, and pneumonia.

On the other hand, in 1896 the death-rate was highest in North Manchester from measles, diphtheria, influenza, and diseases of the urinary organs.

We may affirm, from these particulars alone, that the inhabitants of the Northern Division are, taking them as a whole, better housed and more careful in their personal habits than are those of the other two divisions.

Table N permits us to pursue this differential inquiry into the different periods of life, and Table K enables us to see how the divisions of the City stand to each other as regards the loss of infant life.

TABLE 9.—Populations—Deaths of Manchester Residents, 1896, in Public Institutions.

Township	Name of Institution	Population, 1891	Deaths, 1896
Ancoats	Ancoats Hospital	64	89
Central	Workhouse Casual Wards	167	2
	Royal Infirmary	260	284
	St. Mary's Hospital	27	11
	Lock Hospital	25	1
	Eye and Ear Hospital	7	2
	Alsop's Boys' Home	11	...
	St. Joseph's Girls' Home	17	...
	Chetham Hospital	100	...
	Mission Refuge (St. John's Parade)	8	...
	Consumption Hospital	...	...
	Children's Hospital (Gartside Street)	...	1
St. George's	Girls' Home (Charter Street)	21	...
Cheetham	Her Majesty's Prison	922	7
	Boys' Refuge	185	1
	Girls' Friendly Society	18	..
	Clinical Hospital	36	58
Crumpsall *	Manchester Workhouse	2,608	829
	Prestwich Workhouse	305	87
Blackley	Manchester and Salford Reformatory	76	...
	Litchford Hall	152	...
	Well's House Convalescent Home	10	...
Moston	St. Mary's Home	...	1
	St. Joseph's Home	34	1
	St. Bridget's Orphanage	32	...
Newton	Monsall Hospital	185	238
	Little Sisters of the Poor (Culcheth Hall)	107	8
Clayton	Clayton Smallpox Hospital	...	...
Ardwick	Industrial School	203	...
	Nicholls Hospital	100	...
Openshaw	Crossley's Home	...	11
Rusholme	St. Joseph's Girls' School	150	...
	St. Mary's Home	28	...
Chorlton-on-Medlock	St. Joseph's Boys' School	413	5
	Royal Eye Hospital	59	...
	Little Sisters of the Poor (Plymouth Grove)	182	36
	Casual Wards (All Saints)	21	...
	Southern Hospital	23	15
	Cancer Hospital	19	17
	Maternity Home	11	7
	Home for Young Girls	18	...
	Rylands' Orphanage	17	...
	Church Army Labour Home	20	...
	Penitentiary	51	...
Hulme	Cavalry Barracks	404	...
	Boys' Home (Chester Road)	20	...
	Loretto Convent	...	...
* Outside City.	Withington Workhouse	1,375	550
	Ashton-under-Lyne Workhouse	...	...
	Pendlebury Hospital	50	32
	Prestwich Lunatic Asylum	755	51
Totals		9,296	2,344

* Proportion only.

The value of Table K lies in this: that it enables us to discern, by another test, whether the parents are careful to rear their children in the best manner, and whether the conditions of the home are in other respects healthy.

The first inquiry is best answered by inquiring what are the infantile mortalities from diarrhœa, from convulsions, and from wasting diseases. From each and all of these causes we find that the Township of Manchester exhibits a much higher infantile death-rate than South Manchester, and South Manchester than North Manchester.

The conditions of feeding being thus discriminated, let us see how we stand as regards other conditions affecting health, such as good clothing, and dry, clean homes.

These conditions may jointly be judged of from such conditions as whooping cough, tubercular disease, and lung diseases. From whooping cough and lung disease the same information is derived as from diseases previously mentioned.

From tubercular disease in infancy, however, the highest fatality is every year assigned to South Manchester.

If we take together "suffocation" and "found dead in bed" as being, on the whole, causes of death which point to intemperance and other bad conditions, then, as before, the Township of Manchester is much worse than South Manchester, and South Manchester than North Manchester.

From Table N again we are enabled to pursue the comparison into the different age periods, and we perceive that at every age period in 1896 the death-rates are considerably higher in the Manchester Township than in South Manchester, the excessive mortality in the Manchester Township being especially marked at the ages 0 to 5, 25 to 45, and 45 to 65.

At every age period, also, the death-rate in South Manchester exceeds that in the Northern Division.

The same differences are observable under every one of the principal diseases. But attention may be especially drawn to the enormous differences under tubercular disease at the higher ages, and to the very great differences under diseases of the lungs at all ages.

The different districts of the City.

By reference to Table H, we find that the birth-rates are higher in Ancoats than in any other district of the City. In North Manchester the birth-rates are highest in Bradford, Beswick, and Harpurhey. I have omitted Clayton as having so small a population that considerable variations are inevitable.

In South Manchester the highest rates are in West Gorton and Ardwick.

It would be interesting to be able to trace the causes with precision which determine fecundity in different districts. These are precisely the same districts which showed the highest birth-rates in 1895, and it is manifest, therefore, that the causes leading to these differences are of a definite character.

The order of the death-rates is also of a fairly definite character.

These are much the highest in the three constituent districts of the Manchester Township, the average being 28·7 per 1,000.

In North Manchester the highest death-rate is in Bradford, viz., 23·45; then follow Clayton and Harpurhey, the death-rate in the latter being 20·19. The other districts exhibit comparatively low death-rates.

In South Manchester the highest death-rate is 22·51 per 1,000 in Hulme, followed by Ardwick with 20·63, West Gorton 20·03, and Chorlton with 20·02.

In 1895 the average death-rate for the Township of Manchester reached the remarkable figure of 31·59 per 1,000.

In North Manchester, in the same year, the highest death-rate was in Bradford with 24·19, followed by Newton Heath with 20·37, and Beswick with 20·35.

In South Manchester, in 1895, the highest mortality was in Hulme with 25·96, followed by West Gorton with 24·45, and Ardwick with 24·42.

The conditions, therefore, repeat themselves, as may be seen, also, on reference to previous years.

In 1894 the death-rate was, for North Manchester, highest in Bradford, followed at a considerable interval by Newton Heath. For South Manchester it was highest in Hulme, followed by West Gorton.

I have in previous reports called attention to the excessive death-rates in Bradford and West Gorton, which I believe to be associated with the condition of the privies in these districts.

It has seemed to me of considerable interest, considering the influence of Crumpsall Workhouse in attracting infirm people to the Township of Manchester, and the nomadic character of part of the population, to separate that part of the deaths which takes place in the home from the portion which occurs in public institutions.

The following table, which corresponds to a similar table given in 1895, exhibits the result. We thus come on the surprising fact that, when we have regard only to deaths in the home, such deaths being, however, reckoned on the whole population of each district, even when a considerable section of the deaths that occurred in Crumpsall Workhouse, the death-rate of Bradford is above that of the Central and St. George's District. Nothing could more plainly demonstrate the potent effect of insanitary conditions in the Bradford District.

TABLE 10—1896.—DEATH RATES* IN THE HOMES OF THE PEOPLE, IN WORKHOUSES, AND IN HOSPITALS FOR THE VARIOUS DIVISIONS OF THE CITY.

STATISTICAL DIVISIONS		Estimated Populations	Death-rate per 1,000 of persons dying in their own homes	Death-rate per 1,000 of persons dying in Workhouses	Death-rate per 1,000 of persons dying in Hospitals	Total death-rate per 1,000
City of Manchester ...		‡ 531,697	17·65	2·72	1·62	21·99
I. Manchester Township		146,186	20·85	5·58	2·27	28·70
II. Northern Districts ...		139,013	15·92	0·62	1·26	17·80
III. Southern Districts ...		246,498	16·71	2·21	1·44	20·36
I.	Ancoats	45,991	22·84	3·85	2·51	29·20
	Central	36,584	18·51	7·32	2·45	28·28
	St. George's	63,611	20·75	5·82	2·00	28·57
II.	Cheetham	30,660	12·24	0·67	1·35	14·26
	Crumpsall	9,209	14·00	0·43	1·18	15·61
	Blackley	7,888	13·23	1·00	0·75	14·98
	Harpurhey	11,265	18·44	0·70	1·05	20·19
	Moston	6,338	14·91	...	2·33	17·24
	Newton Heath	36,602	16·22	0·48	1·08	17·78
	Bradford	22,461	20·87	0·96	1·62	23·45
	Beswick	10,602	15·23	0·46	1·02	16·71
	Clayton	3,988	19·99	0·25	0·99	21·23
III.	Ardwick	37,128	17·48	1·56	1·59	20·63
	Openshaw	29,686	17·08	1·23	1·09	19·40
	West Gorton	27,236	17·32	1·12	1·59	20·03
	Rusholme and Kirk.	19,162	13·05	0·87	0·93	14·85
	Chorlton-on-Medlock	61,308	15·47	3·11	1·44	20·02
	Hulme	71,978	17·98	2·94	1·59	22·51

* In this table, *every death* occurring in a Public Institution has been referred to the District from which the patient originally came.

‡ Population estimated to middle of 1896.

It might be supposed that the fact that a considerable section of the population of the Central and St. George's districts is of a changing character would diminish the weight of this comparison. We cannot, however, allow that the number of this element in the City at any one time is sufficient to do more than somewhat to diminish the impression which these figures make.

Here, again, we have to record that the corresponding table for 1895 revealed the same excess, for the district of Bradford, of people dying in their homes.

The very large part which deaths in Crumpsall Workhouse and in the other institutions of the City plays in making up the mortality of the Manchester Township is also shown by this table.

As regards the other districts, there is a general accord between the figures for the two successive years which indicates that the figures in the third column are valuable indices to the poverty existing in the different districts.

Nor are those in the fourth column without value for the same reason, indicating as they do, though not so certainly, a degree of poverty only less deep than is shown in column 3.

It appears to me that it is well, in endeavouring to deal with insanitary conditions, to know where special exertions are most urgently called for, and I should certainly select Bradford and West Gorton as the districts outside the Township of Manchester to which our efforts should be first directed.

INFECTIOUS DISEASES.

The diseases included in the Manchester Notification Act of 1881 are as follows: Smallpox, Scarlet Fever, Diphtheria, Typhus Fever, Enteric or Typhoid Fever, Relapsing Fever, Puerperal Fever, and Asiatic Cholera. Membranous Croup was added in 1892. The following cases were notified in 1896 and five previous years:—

	1891	1892	1893	1894	1895	1896
Smallpox.....	2	118	607	282	51	1
Scarlet Fever	1,138	1,671	2,031	2,230	2,302	2,389
Diphtheria ..... } Membranous Croup }	456	497	622	512	402	239
Typhus Fever.....	16	6	1	...	...	1
Enteric Fever.....	761	610	618	460	493	513
Relapsing Fever.....	4	..	...	...	...	...
Puerperal Fever.....	55	92	93	51	33	25
	2,432	2,994	3,972	3,535	3,281	3,168

The number of deaths for five years from the more common diseases is shown in the following table :—

From	In 1891	1892	1893	1894	1895	1896
Measles	220	369	293	222	505	567
Scarlet Fever	114	139	140	116	173	198
Diphtheria	122	91	122	102	72	54
Membranous Croup..,	6	39	60	47	41	29
Enteric Fever	189	124	127	91	95	118
Smallpox	0	2	49	21	2	0
Influenza	347	140	120	45	194	53
Whooping Cough ...	518	368	240	286	250	359
	1,516	1,272	1,151	930	1,332	1,378

ON SCARLET FEVER.

In my last report I gave a tracing showing the number of cases of scarlet fever reported week by week, side by side with curves showing the number of cases of typhoid fever and the number of deaths from diarrhœa. From these it seemed probable that the same influences prevailed in scarlet fever as in the other two diseases. There is good reason for supposing that the annual increase in autumn of diarrhœa and typhoid fever is connected with an increased growth in favourable soil of the germs of those diseases, and the curve of scarlet fever indicates very strongly that the same is true of this disease also.

This being so, the impure state of the ground over a large part of the City, owing to the defective state of the privies, acquires a greatly increased importance, and I have, therefore, summarised the conditions of closets found in connection with cases of scarlet fever in 1891.

It may be assumed in general, where there is no urine guide to a pail-closet, that the ground is in a wet and sodden condition.

I have divided the cases into those which seemed clearly traced; those in which some clue was afforded to the source of infection, but not of a sufficient character; and those in which the source of the infection was quite untraced.

As regards cases in which the source of infection was clearly ascertained, in a great proportion of these the source of infection was at home. In the majority of these, conditions may be expected identical with those existing

in the case of the first untraced cases. They are, therefore, divided into cases infected at home and cases infected outside the home, in which last the conditions of the closet should be presumably indifferent.

The figures are—

Cases Clearly Traced to Previous Infection at Home.

Pail Adjoins the House			Pail within Four Feet		
Guide not defective	Guide defective	Closet otherwise defective	Guide not defective	Guide defective	Otherwise defective
125	65	26	10	8	5
216			23		

Pail Four Feet and Over			Midden				
Guide not defective	Guide defective	Otherwise defective	Adjoins house	Within 6 feet	Six feet and over	Water-closet	Waste water-closets
110	24	24	17	12	62	50	10
158			91			60	

Total..... 548

Cases Traced to Infection Outside the Home.

Pail Adjoins			Pail within Four Feet			Pail Four Feet and Over		
Guide not defective	Guide defective	Otherwise defective	Guide not defective	Guide defective	Otherwise defective	Guide not defective	Guide defective	Otherwise defective
24	14	12	5	2	0	27	12	6
50			7			45		

Midden				
Adjoins	Within 6 feet	Six feet and over	Water-closet	Waste water-closet
0	8	22	1	6
30			7	

Total..... 139

CASES NOT CLEARLY TRACED; IN THE GREAT MAJORITY OF INSTANCES CONNECTED WITH OUTSIDE PREVIOUS CASES.

Pail Adjoins			Pail within Four Feet			Pail over Four Feet		
Guide not defective	Guide defective	Otherwise defective	Guide not defective	Guide defective	Otherwise defective	Guide not defective	Guide defective	Otherwise defective
78, of which 60 outside	39, of which 27 outside	5, of which 3 outside	10, of which 7 outside	5, of which 5, outside	1, of which 1 outside	53, of which 36 outside	18, of which 14 outside	2, of which 0 outside

Midden					Total.
Adjoins	Within 6 feet	Six feet and over	Water-closet	Waste water-closet	
8, of which 5 outside	5, of which 3 outside	32, of which 24 outside	28, of which 26 outside	9, of which 7 outside	293 218

CASES NOT TRACED.

Pail Adjoins			Within Four Feet			Four Feet and Over		
Guide not defective	Guide defective	Otherwise defective	Guide not defective	Guide defective	Otherwise defective	Guide not defective	Guide defective	Otherwise defective
303	212	50	35	22	7	275	124	19

Midden					Total.
Adjoins	Within 6 feet	Six feet and over	Water-closets	Waste water-closets	
54	48	109	105	25	1,388

Total number of Cases, 2,368

It cannot be said that these figures, when compared, show a very exceptionally bad condition of closets at houses in which cases occurred which could not be traced.

They do, however, show throughout a specially bad condition of closets associated with scarlet fever; and, perhaps, taking into account the smallness of the figures under the heading "Cases traced to infection outside the house," this is especially noticeable under the heading of "Cases not traced."

Of these there are altogether 1,388, as against 980 cases more or less clearly traced.

Of the 1,388, 565 are associated with pail-closets adjoining the house, of which 252 are defective.

Of the 980, 388 are so associated, and the number of these found defective was 157.

If we take only infections contracted outside the home, more or less clearly traced, we have 357 cases, of which 140 are associated with pails adjoining the house, 56 of these being defective.

The proportion of defective pails adjoining the house is thus greatest amongst the untraced cases.

Then, again, amongst the 1,388 there are 54 instances of middens adjoining the house, as against 25 amongst the 980 more or less clearly traced, and as against 5 amongst the 357 cases traced more or less clearly to outside infection.

We must admit that whether these figures are or are not to be taken as especially connecting scarlet fever with defective conditions of the closet, the conditions of fouling of the ground shown by the above analysis ought not to be tolerated in a community such as this.

On Infection in Scarlet Fever.

An analysis has been made of the facts relating to almost all of the cases of scarlet fever reported in 1896, from which I extract the following particulars :—

Cases Clearly Traced.

Previous recent infection at home	422
Infection at school	31
From infected houses	55
From playmates ..	46
From overlooked cases	53
From cases at home discharged from hospital	60
From cases, not in the same house, discharged from hospital	10
From cases recovered at home	2
From cases recovered outside	0
From other sources	7
	686

The distinction between clearly and doubtfully traced cases is not always a satisfactory one. As regards discharge cases, it is taken to mean length of time that the case discharged has been at home. As regards other cases, it is a matter of clear evidence or high degree of probability of contact with a known source of infection.

The cases which have been traced with less clearness are as follows :—

DOUBTFULLY TRACED.

At home	11
At school	103
Visiting infected houses	15
Neighbourhood infection	53
Recovery cases at home	2
Recovery cases outside	4
Discharge cases from hospital at home	13
Discharge cases from hospital outside	6
From overlooked cases	10
From other sources	82

299

Those included under "other sources" give a fair idea of the difficulties as well as of the advantages of tracing the source of infection, and they are, therefore, given in detail.

No. on Register	CASES DOUBTFULLY TRACED.
16	In Hospital A from visitors.
26	Contracted in Hospital B.
39	"Quinsy" in sister three weeks before.
63	From mother of return case, supposed to have contracted scarlet fever.
124	Father had sore throat eleven days before.
125	Father had sore throat fourteen days before.
131	From a child ill of "quinsy."
162	Case of "croup" in sister five days before.
186	Contracted in Hospital B.
226	Medical Attendant had before visiting, two days previously, seen three cases of scarlet fever (?).

240 Mother just recovered from "quinsy."

244 Mother had relaxed throat for a week before.

310 Father suffered from "quinsy" rather over a week ago.

312 Brother has just recovered from "catarrh."

317 Two brothers had "quinsy" about a month before.

338 Three days before was at a children's party, where there was a child with "sore throat."

346 Mother has had "sore throat" for fourteen days.

353 Previous case of "diphtheria."

424 Mother washed clothing next door which had been infected with "scarlet fever."

487 From mother of scarlatinal nursling coming to the shop.

489 The mother of this child has recovered from "diphtheria" about six days.

510 Sister has been suffering from "sore throat" for three weeks; no desquamation.

525 Mother has been suffering from "sore throat" for a month, now convalescent.

541 Son discharged from Hospital after being treated for "diphtheria." Home 15 days.

815 "Scarlatina," nursed at home in house, with house now affected. Mother deals in old clothes.

826 In contact with child supposed to have "measles."

1100 F. aet. 40. Patient was in the habit of lending her shawl to Mrs. W, whose children have had scarlet fever and just recovered.

1208 Father and mother have sore throat.

1210 Two other children removed to hospital with "pneumonia." This was an overlooked case.

1256 Sister had congestion of the lungs and roughness of skin when recovering.

1282 After a visit from children from a house suspected to be infected.

1296 In contact with a case in the same street fourteen days before.

1297 Father began with "quinsy" five days before.

1307 Mother has just recovered from an attack of "quinsy."

1369 Mother is suffering from "tonsillitis."

1377 Dressmaker, aet. 25, from altering old dresses which had been disinfected after scarlet fever.

1399 Sister has just been suffering from sore throat.

1404 Two sisters have been ill with "mumps."

1405 Mother and brother have sore throat.

1441 Servant at the same house has had sore throat.

1442 Mother and brother have had sore throat.

1470 Brother has had headache and sore throat.

1475 Nurse in Hospital. Two other nurses are suffering from "tonsillitis."

1478 Brother had a sore throat a week previous.

1492 Playing with straw from old mattress thrown out of an infected house.

1510 Father is suffering from "quinsy."

1512 Father is suffering from "quinsy."

1519 Sister has had sore throat.

1614 Mother suffering from sore throat.

1632 Fellow-workman away with sore throat.

1633 Papering house where two cases of scarlet fever had occurred.

1681 Child from infected house came to stay here three days before.

1698 Mother has sore throat.

1760 Brother has sore throat.

1787 Brother dead of "pneumonia"; sister ill.

1800 Father has sore throat.

1824 Patient has contracted disease in Blackpool; there is said to be a case of "quinsy" in the house.

1930 Mother has sore throat.

1932 Mother attending hospital with "quinsy."

1934 Taken five days before to see body of a child which had died of "diphtheria."

1944 Mother has sore throat.

1980 Mother has sore throat.

1989 Attended funeral of case of scarlet fever eight days before eruption.

2012 Playmate had lumps at angles of jaw.

2044 Sister ill with rheumatism.

2048 Father and mother have "quinsy."

2067 Brother has stiff neck; was feverish about two weeks ago.

2071 Brother has had measles one month.

2075 Intimate companion of disinfector.

2088 Brother has sore throat.

2099 Brother had sore throat a fortnight ago.

2125 Sister has just got over ‘ quinsy.”

2151 Father has “quinsy.”

2157 Brother has an abscess in throat.

2161 Father is an ambulance officer.

2190 Father has been suffering from severe catarrh.

2234 Contracted in General Hospital.

2238 Has played with children from an infected house.

2240 Has played with children from an infected house.

2270 Brother has had swollen glands.

2327 Mother has been frequently in contact with a case of scarlet fever five doors off.

It will be observed with what frequency parents have had an affection of the throat without eruption, and no doubt the disease is often transmitted in this way at home and elsewhere.

It would seem that “quinsy” is one of the chief shapes which irregular attacks of scarlet fever may assume.

Infection at School.

With a view to ascertain what part the school plays in the distribution of scarlet fever, I have excerpted the cases which occurred at the respective schools amongst the first 500 cases, placing opposite each number in the register a statement as to whether any other source of infection had been ascertained, thus :—

G. B. Board School.	Board School No. 2.	Board School No. 3.
192	144	243
287 (I.) *	178	263
289 (I.) *	297	265
301	374	266 (I.) *
320 (I.) *	411	381
321 (I.) *	462	382 (I.) *
322 (I.)	....	416 (I.) *
351 (I.) *	....	417
454	....	.....

* I. stands for cases the source of infection of which has been traced away from school.

In the first of these schools where the source of infection of six children could be traced outside the school, and where the cases occurring in the school were separated by a considerable interval of time, no infection at school was inferred. In the second and third, it was considered that there was evidence of the school having been the place where the disease was transmitted. This was, in fact, specifically alleged in regard to case 178 at school 2, and in regard to 263 and 381 at school 3.

Proceeding in this manner, we find that out of the first 500 cases children go to 99 schools, and that in 30 of them there is good reason for believing infection to have been transmitted.

It is probable, indeed, that the schools, inevitably, play a very considerable part in the transmission of scarlet fever; but it is here that we ought to be able to do most to prevent the ill effects of aggregating a number of children.

I have mentioned, under the heading "Measles and Whooping Cough," additional steps which I consider ought to be taken to prevent children from infecting each other at school.

We have not, so far, closed schools for purposes of disinfection only.

ON RETURN CASES OF SCARLET FEVER.

Last year I gave reasons for believing that the occurrence of cases after the return of patients from hospital is essentially a hospital phenomenon, and is dependent on the storage of infective material derived from cases more recently admitted into the same ward, especially in the nostrils of the discharged case. Before going on to mention the action which the Sanitary Committee have taken to test this view, I would add to the particulars brought together for 1894 and 1895 further particulars for 1896, which seem to confirm the view previously expressed that the phenomenon is one which belongs to the hospital, and is, therefore, preventable. The following are the particulars for 1896, for which I am indebted mainly to the Medical Officers of Monsall Hospital.

SCARLET

Return Cases.

Prog. No.	Date of Eruption	Prog. No. previous Case	Date of Notification	Date of Eruption	Date of Removal	Date of Return	Interval between Return and Eruption	Interval between First and Second Eruption	Hospital to which first case Removed
							Days	Days	
123	12th Jan.	1762	23rd Oct.	20th Oct.	25th Oct.	31st Dec.	12	84	Monsall
149	16th Jan.	2028	20th Nov.	19th Nov.	20th Nov.	14th Jan.	2	58	Monsall
196	24th Jan.	1791	26th Oct.	25th Oct.	26th Oct.	10th Jan.	14	91	Monsall
198	22nd Jan.	1865	4th Nov.	1st Nov.	4th Nov.	13th Jan.	9	82	Pendlebury
290	4th Feb.	1780	25th Oct.	23rd Oct.	26th Oct.	21st Jan.	14	104	Monsall
294	5th Feb.	2029	20th Nov.	20th Nov.	21st Nov.	24th Jan.	12	77	Monsall
316	9th Feb.	1890	6th Nov.	2nd Nov.	6th Nov.	31st Jan.	9	99	Monsall
339	11th Feb.	2200	12th Dec.	Onset, 6th Dec.	12th Dec.	4th Feb.	7	67	Pendlebury
345	11th Feb.	2200	12th Dec.	Onset, 6th Dec.	12th Dec.	4th Feb.	7	67	Pendlebury
388	18th Feb.	2230	17th Dec.	15th Dec.	17th Dec.	14th Feb.	4	65	Monsall
389	19th Feb.	2230	17th Dec.	15th Dec.	17th Dec.	14th Feb.	5	66	Monsall
491	8th Mar.	87	11th Jan.	10th Jan.	11th Jan.	3rd Mar.	5	57	Monsall
513	9th Mar.	68	8th Jan.	6th Jan.	8th Jan.	26th Feb.	11	62	Pendlebury
514	10th Mar.	68	8th Jan.	6th Jan.	8th Jan.	26th Feb.	12	63	Pendlebury
528	13th Mar.	44	4th Jan.	4th Jan.	4th Jan.	3rd Mar.	10	68	Monsall
530	13th Mar.	149	20th Jan.	16th Jan.	21st Jan.	10th Mar.	3	56	Monsall
615	25th Mar.	176	22nd Jan.	21st Jan.	22nd Jan.	20th Mar.	5	63	Monsall
798	Notified 22nd April	296	6th Feb.	6th Feb.	6th Feb.	14th April	8	75	Monsall
846	29th April	278	4th Feb.	2nd Feb.	4th Feb.	17th April	12	86	Monsall
869	5th May	448	3rd Mar.	2nd Mar.	3rd Mar.	28th April	7	64	Monsall

FEVER, 1896.

Clear—Home.

Hospital to which subsequent Case was Removed	Contracted at		Complications of First Case at Discharge	Remarks Other Sources of Infection
	Home	Another House		
Monsall	†	...	No complications.	.....
Monsall	†	...	No complications.	.....
Monsall	†	...	No complications. Patient was kept in a week after she was considered free from infection.	.....
Monsall	†	...	....	.....
Monsall	†	...	Discharge from ears. Patient was sent out with discharging ears.	.....
Monsall	†	...	No complications.	.....
Monsall	†	...	Both ears discharged. Patient was detained on their account.	.....
Monsall	†	...	....	.....
Monsall	†	...	....	.....
Monsall	†	...	Both ears discharged, but stopped discharging. Patient was detained on account of nasal discharge, 10th Feb.	.....
Monsall	†	...	Both ears discharged, but stopped discharging. Patient was detained on account of nasal discharge, 10th Feb.	.....
Monsall	†	...	Both ears discharged five days previous to patient leaving hospital.	.....
Monsall	†	...	....	.....
Monsall	†	...	....	.....
Monsall	†	...	No complications.	.....
Home	†	...	No complications.	.....
Monsall	†	...	No complications.	.....
Monsall	†	...	Had hæmorrhagic nephritis, which cleared up. Slight rough patch on face when patient left hospital.	.....
Monsall	†	...	Patient had discharge from left ear and suppurative inflammation of left orbit. Not noted later than 10th March. Not mentioned in connection with departure. Patient detained for desquamation on head.	.....
Monsall	†	...	No complications.	.....

SCARLET FEVER,

Return Cases.

Prog. No.	Date of Eruption	Prog. No. previous Case	Date of Notification	Date of Eruption	Date of Removal	Date of Return	Interval between Return and Eruption	Interval between First and Second Eruption	Hospital to which first case Removed
873	4th May	153	20th Jan.	18th Jan.	21st Jan.	24th April	Days 10	Days 106	Monsall
881	2nd May	131	16th Jan.	14th Jan.	16th Jan.	18th April	14	108	Monsall
888	8th May	336	12th Feb.	11th Feb.	12th Feb.	5th May	3	86	Monsall
1017	29th May	427	28th Feb.	26th Feb.	28th Feb.	22nd May	7	92	Monsall
1057	5th June	718	11th April	10th April	11th April	24th May	12	56	Pendlebury
1086	8th June	...	...	...	...	...	3	...	Ladywell
1135	18th June	529	16th Mar.	15th Mar.	16th Mar.	9th June	9	95	Monsall
1393	21st July	877	6th May	5th May	6th May	10th July	11	77	Monsall
1414	24th July	1017	30th May	29th May	1st June	21st July	3	56	Monsall
1514	3rd Aug.	955	20th May	19th May	22nd May	21st July	13	76	Monsall
1573	7th Aug.	1129	16th June	15th June	16th June	30th July	8	53	Pendlebury
1576	11th Aug.	1146	19th June	6th June	19th June	7th Aug.	4	66	Monsall
1701	30th Aug.	1115	13th June	13th June	13th June	25th Aug.	5	78	Monsall
1720	30th Aug.	1216	29th June	25th June	28th June	25th Aug.	5	66	Monsall
1781	11th Sept.	1124	16th June	13th June	16th June	8th Sept.	3	90	Monsall
1785	9th Sept.	1172	23rd June	Onset, 15th June	23rd June	1st Sept.	8	86	Monsall
1805	10th Sept.	1316	11th July	9th July	11th July	1st Sept.	9	63	Monsall
1806	12th Sept.	1316	11th July	9th July	11th July	1st Sept.	11	65	Monsall
1925	25th Sept.	1173	23rd June	23rd June	23rd June	15th Sept.	10	94	Monsall

1896—*continued.*

CLEAR—HOME.

Hospital to which subsequent Case was Removed	Contracted at		Complications of First Case at Discharge	Remarks Other Sources of Infection
	Home	Another House		
Monsall	†	...	Discharge from both ears, last noted 3rd April, suppurating glands left side of neck, not mentioned later than 16th February.	.....
Monsall	†	...	Discharge from nose. Patient had nasal discharge, which seemed to have stopped before leaving hospital; both ears discharged; abscess in axilla.	.....
Monsall	†	...	Both ears discharged, abscess in axilla.	.....
Monsall	†	...	No complications.	.....
Monsall	†	...	Discharge from ears.	.....
Monsall	†	...	....	Patient's sister (Emily) was removed from 45, Alpha Street, Seedley, to Ladywell, where she was treated 6 weeks, suffering from scarlatina.
Monsall	†	...	Slight discharge from ears and nose. Both ears discharged early. No mention of discharge later.	.....
Monsall	†	...	No complications.	.....
Monsall	†	...	Left ear discharged, stopped a few weeks previous to patient leaving hospital.	.....
Monsall	†	...	No complications.	.....
Pendlebury	†	...	Free discharge from ears.	.....
Monsall	†	...	No complications.	.....
Monsall	†	...	Patient had discharge from nose and left ear, which stopped at least 5 days before patient left hospital.	.....
Monsall	†	...	No complications.	.....
Monsall	†	...	Discharge from nose. Right ear discharged early, not mentioned later, nasal discharge noted August 27th and 30th only.	.....
Monsall	†	...	Patient had nasal discharge, which stopped before patient left hospital.	.....
Monsall	†	...	*No complications.	*Cough, and discharge from nose.
Monsall	†	...		
Monsall	†	...	Patient went out with discharging left ear.	.....

SCARLET FEVER,

RETURN CASES.

Prog. No.	Date of Eruption	Prog. No. previous Case	Date of Notification	Date of Eruption	Date of Removal	Date of Return	Interval between Return and Eruption	Interval between First and Second Eruption	Hospital to which first case Removed
							Days	Days	
1937	29th Sept.	1434	2;th July	23rd July	28th July	22nd Sept.	7	68	Monsall
1991	8th Oct.	1419	25th July	22nd July	25th July	2nd Oct.	6	78	Monsall
1992	9th Oct.	1419	25th July	22nd July	25th July	2nd Oct.	7	79	Monsall
2010	10th Oct.	1334	14th July	12th July	14th July	2nd Oct.	8	90	Monsall
2040	14th Oct.	1750	7th Sept.	6th Sept.	7th Sept.	9th Oct.	5	38	Pendlebury
2064	21st Oct.	1518	5th Aug.	4th Aug.	6th Aug.	16th Oct.	5	78	Monsall
2068	20th Oct.	1715	2nd Sept.	31st Aug.	2nd Sept.	13th Oct.	7	50	Pendlebury
2069	22nd Oct.	1715	2nd Sept.	31st Aug.	2nd Sept.	13th Oct.	9	52	Pendlebury
2070	22nd Oct.	1430	26th July	24th July	26th July	16th Oct.	6	90	Monsall
2222	17th Nov.	1856	21st Sept.	19th Sept.	21st Sept.	12th Nov.	5	59	Pendlebury
2275	1st Dec.	1965	5th Oct.	3rd Oct.	5th Oct.	25th Nov.	6	59	Pendlebury
2384	25th Dec.	2085	26th Oct.	23rd Oct.	26th Oct.	22nd Dec.	3	63	Monsall
2404	22nd Dec.	2014	13th Oct.	11th Oct.	13th Oct.	18th Dec.	4	72	Monsall

RETURN CASES. CLEARLY

22	30th Dec.	1824	30th Oct.	29th Oct.	30th Oct.	20th Dec.	10	62	Monsall
182	21st Jan.	1894	6th Nov.	5th Nov.	6th Nov.	17th Jan.	4	77	Monsall
278	2nd Feb.	1780	25th Nov.	23rd Nov.	26th Nov.	21st Jan.	12	71	Monsall
318	8th Feb.	2089	28th Nov.	27th Nov.	28th Nov.	31st Jan.	8	73	Monsall
419	24th Feb.	2195	12th Dec.	12th Dec.	13th Dec.	14th Feb.	10	74	Monsall

1896—*continued.*

CLEAR—HOME.

Hospital to which subsequent Case was Removed	Contracted at		Complications of First Case at Discharge	Remarks Other Sources of Infection
	Home	Another House		
Monsall	†	...	Very doubtful discharge from left ear, noted September 17th—this the only mention.	.....
Monsall	†	...	No complications except scabies.	.....
Monsall	†	...		
Home	†	...	Patient had discharge from right ear; not stated whether it stopped before leaving the hospital.	.....
Monsall	†	...	Discharge from the ears; stockings were covered with scales.	.....
Monsall	†	...	Had hæmorrhagic nephritis, which cleared up.	.....
Pendlebury	†	...	Bad throat, and feet peeling.	.....
Pendlebury	†	...		
Monsall	†	...	Slight peeling on hands and left foot. Patient went out with hæmorrhagic nephritis.	.....
Monsall	†	...	....	.....
Monsall	†	...	Discharge from nose.	.....
Monsall	†	...	Patient had hæmorrhagic nephritis, which cleared up; no other complications.	.....
Monsall	†	...	Patient had temporary albuminuria; no other complications.	.....
TRACED—OUTSIDE CONTACT.				
Monsall	...	†	Only complication an attack of varicella, spots first appearing on Nov. 12th.	.....
Monsall	...	†	Both ears discharged; last mentioned 2nd December. Patient was kept back on account of nasal discharge on 6th January.	.....
Monsall	...	†	Patient was sent out with discharging ears.	.....
Home	...	†	No complications. Patient was detained twice though considered free from infection.	.....
Monsall	...	†	No complications.	.....

SCARLET FEVER,

RETURN CASES. CLEARLY

Prog. No.	Date of Eruption	Prog. No. previous Case	Date of Notification	Date of Eruption	Date of Removal	Date of Return	Interval between Return and Eruption	Interval between First and Second Eruption	Hospital to which first case Removed
							Days	Days	
420	24th Feb.	2195	12th Dec.	12th Dec.	13th Dec.	14th Feb.	10	74	Monsall
474	5th Mar.	Diph-theria 44	7th Feb.	2nd Feb.	7th Feb.	28th Feb.	5	31	Monsall
531	13th Mar.	149	20th Jan.	16th Jan.	21st Jan.	10th Mar.	3	56	Monsall
824	25th Apl.	407	22nd Feb.	20th Feb.	22nd Feb.	14th Apl.	11	64	Monsall
920	14th May	483	9th Mar.	7th Mar.	9th Mar.	8th May	6	68	Monsall
1134	15th June	626	28th Mar.	27th Mar.	28th Mar.	9th June	6	80	Monsall
1193	25th June	828	29th Apl.	27th Apl.	30th Apl.	23rd June	2	59	Monsall
1205	26th June	832	29th Apl.	29th Apl.	29th Apl.	23rd June	3	58	Monsall
1308	7th July	832	29th Apl.	29th Apl.	29th Apl.	23rd June	14	69	Monsall
1734	3rd Sept.	...	...	...	4th Aug.	25th Aug.	9	...	Monsall
1822	29th Aug.	1117	15th June	14th June	16th June	25th Aug.	4	76	Monsall
1823	3rd Sept.	1117	15th June	14th June	16th June	25th Aug.	9	81	Monsall
2000	9th Oct.	1419	25th July	22nd July	25th July	2nd Oct.	7	79	Monsall
1108	11th June	641	30th Mar.	27th Mar.	31st Mar.	2nd June	9	76	Monsall

1896—*continued.*

TRACED—OUTSIDE CONTACT.

Hospital to which subsequent Case was Removed	Contracted at		Complications of First Case at Discharge.	Remarks. Other Sources of Infection
	Home	Another House		
Monsall	...	†	No complications.	.....
Home	...	†	Slight peeling from the arms and feet. No complications.	No specimen taken.
Home	...	†	No complications.	Previous patient's brother also infected. See No. 530.
Pendlebury	...	†	No complications. Skin noted as smooth 7 days and 5 days before discharge.	.....
Home	...	†	Left ear discharged ; only mentioned on 26th March. Slight excoriation of ear and roughness of face, noticed 5 days before patient left hospital.	.....
Monsall	...	†	Ears discharged early ; not mentioned later. Patient had nasal discharge 19 days before leaving ; not mentioned later.	.....
Monsall	...	†	No complications.	.....
Monsall	...	†	Right ear discharged early; not mentioned later. Patient recorded as free from infection (smooth) a fortnight previous to discharge.	.....
Home	...	†	Right ear discharged early; notmentioned later. Patient recorded as free from infection (smooth) a fortnight previous to discharge.	.....
Pendlebury	...	†	No signs of scarlet fever ; temperature always normal. Patient whooping on admission, and kept in enteric block.	Previous case sent into hospital as scarlet fever. Monsall diagnosis, whooping cough.
Monsall	...	†	Patient had hæmorrhagic nephritis, which cleared up ; skin smooth a week previous to discharge. Brother went out 28th August with hæmorrhagic nephritis.	Also three other children from the house in which previous case occurred. Discharged from Monsall Hospital 21st August, 28th August, 28th August.
Monsall	...	†	Patient had hæmorrhagic nephritis, which cleared up ; skin smooth a week previous to discharge. Brother went out 28th August with hæmorrhagic nephritis.	
Monsall	...	†	No complications, except scabies.	.....
Monsall	...	†	Discharge from right ear. Skin smooth a fortnight before discharge. Left ear stopped 10 days before discharge.	.....

SCARLET FEVER,

Return Cases.

Prog. No.	Date of Eruption	Prog. No. previous Case	Date of Notification	Date of Eruption	Date of Removal	Date of Return	Interval between Return and Eruption	Interval between First and Second Eruption	Hospital to which first case Removed
145	19th Jan.	1882	6th Nov.	5th Nov.	6th Nov.	31st Dec.	Days 20	Days 75	Monsall
267	31st Jan.	1996	17th Nov.	17th Nov.	17th Nov.	14th Jan.	17	75	Monsall
668	31st Mar.	...	...	...	3rd Mar.	21st Mar.	10	28	Monsall
891	9th May	302	7th Feb.	6th Feb.	7th Feb.	15th April	24	89	Pendlebury
1006	25th May	...	...	...	...	29th April	...	...	Pendlebury
1040	2nd June	600	24th Mar.	23rd Mar.	24th Mar.	May 15	18	71	Monsall
1252	3rd July	559	19th Mar.	17th Mar.	19th Mar.	5th June	28	108	Monsall
1321	8th July	757	18th April	16th April	18th April	3rd June	35	83	Pendlebury
1374	17th July	831	29th April	11th April	29th April	12th June	35	97	Monsall
1599	15th Aug.	1077	9th June	7th June	10th June	31st July	15	69	Monsall
1714	2nd Sept	1139	18th June	18th June	18th June	11th Aug.	22	76	Monsall
1827	16th Sept.	1125	16th June	15th June	16th June	21st Aug.	26	93	Monsall
2100	26th Oct.	1331	13th July	11th July	13th July	6th Oct.	20	107	Monsall
2285	2nd Dec.	1776	10th Sept.	9th Sept.	10th Sept.	6th Nov.	26	84	Monsall
2304	29th Nov.	1526	6th Aug.	4th Aug.	6th Aug.	10th Nov.	19	117	Monsall
2402	30th Dec.	1770	10th Sept.	6th Sept.	10th Sept.	15th Dec.	15	115	Monsall

1896—*continued.*

DOUBTFUL—HOME

Hospital to which subsequent Case was Removed	Contracted at		Complications of First Case at Discharge.	Remarks. Other Sources of Infection
	Home	Another House		
Monsall	†	...	No complications. Patients noted as free from infection five days before discharge.	.....
Pendlebury	†	...	Only complication, scarlatinal rheumatism.	.....
Monsall	†	...	Slight suspicion of desquamation. No complications.	First case sent into Monsall as *Diphtheria*. Monsall diagnosis, Tonsillitis.
Pendlebury	†	...	....	.....
Home	†	...	....	Brother contracted scarlatina at date not ascertained.
Monsall	†	...	No complications.	Between return of first and eruption on second case, a child died suddenly. *Inquest* —"*Suffocation and convulsions.*"
Monsall	†	...	Skin smooth week before discharge. Had discharging right ear, last mentioned 28th May.	.....
Monsall	†	...	....	.....
Monsall	†	...	No complications.	.....
Monsall	†	...	No complications.	.....
Monsall	†	...	No complications.	.....
Monsall	†	...	Thin nasal discharge 18 days before patient left hospital. Both ears discharged early. Not mentioned later.	.....
Monsall	†	...	Both ears discharged, last mentioned 1st September, but probably continued till patient left hospital.	.....
Pendlebury	†	...	Excoriation of nostrils noticed a week before discharge.	.....
Monsall	†	...	Discharge from ear. In hospital three months, and showed no sign of clearing up. Discharge left ear, noted 26th October.	.....
Monsall	†	...	Excoriation of nose. Discharge right ear noticed three weeks before leaving hospital.	.....

SCARLET FEVER,

Return Cases.

Prog. No.	Date of Eruption	Prog. No. previous Case	Date of Notification	Date of Eruption	Date of Removal	Date of Return	Interval between Return and Eruption	Interval between First and Second Eruption	Hospital to which first case Removed
							Days	Days	
76	7th Jan.	...	...	...	...	...	...	...	Ladywell
467	2nd Mar.	...	...	...	...	6th Jan.	...	...	Stockport
597	21st Mar.	1980	15th Nov.	2nd Nov.	15th Nov.	28th Jan.	52	139	Monsall
1007	23rd May.	546	17th Mar.	17th Mar.	17th Mar.	8th May	15	67	Monsall
1223	29th June.	706	9th April	7th April	9th April	5th June	24	83	Monsall
1362	16th July.	832	29th April	29th April	29th April	23rd June	23	78	Monsall
1365	20th July.	706	9th April	7th April	9th April	5th June	45	104	Monsall
1489	31st July.	...	...	...	...	30th July	1	...	Stockport
1727	31st Aug.	1131	17th June	14th June	17th June	15th Aug.	16	78	Monsall
1878	22nd Sept.	1149	19th June	19th June	19th June	28th Aug.	25	95	Monsall
1922	27th Sept.	1282	7th July	5th July	7th July	1st Sept.	26	84	Pendlebury
2230	16th Sept.	1626	20th Aug.	18th Aug.	20th Aug.	20th Oct.	27	90	Monsall
71	7th Jan.	1905	8th Nov., 1895	31st Oct., 1895	8th Nov.	31st Dec.	7	68	Monsall

1896—*continued.*

DOUBTFUL—OUTSIDE.

Hospital to which subsequent Case was Removed	Contracted at		Complications of First Case at Discharge.	Remarks Other Sources of Infection
	Home	Another House		
Monsall	...	†	....	.....
Home	...	†	....	On a visit here from *January 6th* to *March 5th*.
Home	...	†	Patient had scarlet fever in Hospital. Attack began December 10th; right ear discharged, only mentioned December 19th; patient was kept back on account of nasal discharge on 20th January.	.....
Home	...	†	No complications.	.....
Monsall	..	†	Some eczematous patches on dorsa of feet on discharge. Patient had Rötheln in hospital 25 days before discharge, rash appearing May 11th.	.....
Monsall	...	†	Right ear discharged early. Not mentioned later. Patient recorded as free from infection (smooth) a fortnight previous to discharge.	.....
Monsall	...	†	Discharge from nose. Some eczematous patches on dorsa of feet, &c. (See above).	.....
Home	...	†	....	On a visit here, *July 25th to 31st July*. Took ill on the night of the 30th July, and was brought home the following day.
Pendlebury	...	†	Nose seemed sore on discharge. Nurse reported that there had been no nasal discharge.	.. ...
Monsall	...	†	No complication. "Pinhole" desquamation on feet at the end of 10 weeks.	.....
Pendlebury	...	†	....	.....
Home	...	†	Both ears discharged; last mentioned 3rd October.	.....
Monsall	...	†	No complication.	In contact about *one minute* on 2nd January.

SCARLET FEVER, 1896—*continued.*

Recovery Cases.

Prog. No.	Date of Eruption	Prog. No. of previous Case	Date of Eruption	Date of Recovery	Interval between First and Second Eruption	Complications of First Case at Recovery	Remarks—Other Sources
				Clear—	Home	Contact.	
470	3rd March	158	18th Jan.	20th Feb.	44		
473	6th March	189	24th Jan.	27th Feb.	41		
				Doubtful—	Home	Contact.	
234	19th Jan.	2006	16th Nov.	29th Dec.	64		
981	20th May	702	24th March	1st May	57		
				Doubtful—	Outside	Contact.	
57	1st Jan.	1868	2nd Nov.	13th Dec.	60		
86	7th Jan.	1703	16th Oct.	29th Nov.	83		
375	17th Feb.	2254	6th Dec.	21st Jan.	73		
428	28th Feb.	99	7th Jan.	2nd May	52		
548	18th March	231 232	10th Jan. 27th Jan.	26th Feb.	67 50		
1025	23rd May	776	15th April	28th May	38		

The Sanitary Committee being of opinion that effect should be given to the view mentioned at the commencement of this section, in the early part of 1897 instructions were given that the wooden pavilions erected during the smallpox outbreak on the ground then belonging to the Dean and Canons, should be utilised for the reception of cases before discharge. In order to keep the patients as free from complications as possible, only those cases were at first treated in these wards who were free from discharging lesions. The principles of treatment were as follows :—

At first a week, and subsequently a fortnight before discharge, the patients were anointed with carbolic oil, were put in clean clothes, and were taken over to the convalescent wards.

There they were bathed every second day, and again, after each bath, rubbed over with carbolic oil.

The object of thus keeping the skin always anointed was to prevent the escape into the ward of matters discharged from the skin.

Every day the nose, ears, and mouth of each patient were cleansed, the nose and ears being washed with a solution of permanganate of potash.

In order, also, as far as possible, to detach accumulations of stored infection, the patients are turned out of the wards as much as possible, and encouraged to run about the grounds. This proceeding it was thought might also serve to oxidise the remaining infective matter.

Later on cases with discharging lesions were also treated in this fashion, but, unfortunately, the operations were interrupted by the occurrence of measles in one of the acute wards. They have, however, been resumed.

There can, I think, be little doubt that these proceedings have been attended with success, though it is too soon to be positive on the subject.

Only two return cases have occurred amongst 198 so treated, neither of them Manchester patients. The particulars of treatment are as follows :—

Convalescent patients isolated and specially treated before discharge :—

Pavilions 15 and 16 opened January 21st.
Pavilion 16 was closed May 15th, reopened June 16th.
Pavilion 17 opened July 13th.
Patients discharged from 15 and 16 since January 21st to June 25th—163.
Patients discharged since June 25th to July 13th from 15 pavilion—20.
Patients discharged from pavilion 16—15.
Total number discharged—198.

Patients at present in 15—21
Patients at present in 16—22 } Total, 54.
Patients at present in 17—11

It remains to add that there is no reason for believing that milk played any part in the diffusion of scarlet fever during 1896.

ANNUAL TABLES RELATING TO SCARLET FEVER.

It will be seen from the accompanying tables that the number of cases of scarlet fever reported in 1896 was somewhat in excess of the number in 1895, and that the mortality was decidedly higher. The percentage of cases removed to hospital was higher than in any previous year. On referring to the tables showing the mortalities at different ages, it will be seen that the number of deaths in proportion to number of cases at different ages, when taken over a number of years, diminishes as the age of the cases advances up to the age of 10, though this may not be manifest in any one year.

On referring to the number of cases reported week by week, we perceive that the usual autumnal rise is less marked than in previous years, though still quite manifest. The death-rate is high as compared with that prevailing over the country generally.

Scarlet Fever Attacks, 1896.

Districts of Manchester	Attacks	Attack Rate per 1,000 living	† Case Fatality, per cent.	Removals to Hospital, per cent.
Ancoats	125	2·68	13·6	82·4
Central	146	3·93	8·9	89·0
St. George's	246	3·81	11·4	80·9
Cheetham	128	4·11	3·9	76·5
Crumpsall	33	3·53	12·1	57·6
Blackley	18	2·25	11·1	50·0
Harpurhey	34	2·97	...	67·6
Moston	49	7·61	8·2	73·5
Newton Heath.....	161	4·33	6·2	64·6
Bradford	84	3·68	10·7	84·6
Beswick	73	6·78	2·7	84·9
Clayton	20	4·94	5·0	85·0
Ardwick	175	4·64	10·9	67·4
Openshaw.....	117	3·88	6·0	50·4
Gorton (West)	93	3·36	8·6	67·8
Rusholme and Kirk.	64	3·29	3·1	39·0
Chorlton-on-Medlock.	312	5·01	7·7	66·3
Hulme	511	6·99	7·8	82·8
City of Manchester	**2,389**	**4·42**	**8·2**	**73·9**

† Corrected : the fatal cases are those actually occurring amongst the cases notified.

The following table exhibits the number of attacks at different ages, and the percentage of fatal cases at each age :—

Scarlet Fever, 1896.

Ages	Attacks	Deaths	Case Fatality*
Under one year	35	4	11·4
1 to 2 years	102	23	22·6
2 to 3 „	176	24	13·6
3 to 4 „	266	43	16·2
4 to 5 „	284	34	12·0
5 to 6 „	259	22	8·5
6 to 7 „	228	15	6·6
7 to 8 „	169	6	3·6
8 to 9 „	159	3	1·9
9 to 10 „	126	3	2·4
10 to 15 „	361	8	2·2
15 to 20 „	97	5	5·2
20 to 25 „	58	2	3·4
25 to 35 „	44	3	6·8
35 to 45 „	22	...	...
Over 45 „	3	...	...
All ages	2,389	195	8·2

* The figures in this column are the actual proportions of fatal cases to the attacks at those ages.

Percentage of Deaths in cases of Scarlet Fever at Different Ages.

Scarlet Fever, 1891, 1892, 1893, 1894, 1895, and 1896.

Ages	Attacks	Deaths	Case Fatality
Under one year	167	37	22·2
1 to 2 years	481	90	18·7
2 to 3 „	852	123	14·4
3 to 4 „	1,143	155	13·6
4 to 5 „	1,159	111	9·6
5 to 6 „	1,149	76	6·6
6 to 7 „	993	51	5·1
7 to 8 „	861	36	4·2
8 to 9 „	688	14	2·0
9 to 10 „	558	11	2·0
10 to 15 „	1,582	34	2·1
15 to 20 „	487	10	2·1
20 to 25 „	227	7	3·1
25 to 35 „	193	5	2·6
35 to 45 „	61	2	3·3
Over 45 „	22	...	...
All ages	10,623	762	7·2

Scarlet Fever. Attacks in Weeks according to Date of Rash.

First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
Jan. 4	41	April 4	56	July 4	57	Oct. 3	50
,, 11	54	,, 11	33	,, 11	58	,, 10	48
,, 18	46	,, 18	60	,, 18	51	,, 17	40
,, 25	70	,, 25	34	,, 25	69	,, 24	40
Feb. 1	51	May 2	30	Aug. 1	45	,, 31	38
,, 8	45	,, 9	37	,, 8	59	Nov. 7	52
,, 15	44	,, 16	46	,, 15	51	,, 14	26
,, 22	47	,, 23	55	,, 22	56	,, 21	27
,, 29	33	,, 30	36	,, 29	47	,, 28	34
Mch. 7	45	June 6	45	Sept. 5	46	Dec. 5	46
,, 14	44	,, 13	47	,, 12	65	,, 12	25
,, 21	46	,, 20	45	,, 19	41	,, 19	27
,, 28	54	,, 27	48	,, 26	49	,, 26	22
						Jan. 2	28
Total...	620	Total...	572	Total...	694	Total...	503

City Total, 2,389.

Scarlet Fever Attacks.—Rate per 1,000 living.

	1891	1892	1893	1894	1895	Mean	1896
Twelve Notification Towns*...	2·95	4·55	5·19	4·23	3·40	**4·06**	4·77
City of Manchester	2·24	3·25	3·92	4·27	4·37	**3·61**	4·42
Manchester Township	1·92	3·63	2·45	3·77	4·23	**3·20**	3·48
North Manchester	2·32	4·64	5·14	5·02	4·24	**4·27**	4·25
South Manchester	2·39	4·28	4·16	4·16	4·52	**3·90**	5·08

* These are Blackburn, Bolton, Bradford, Halifax, Huddersfield, Hull, Liverpool, Oldham, Preston, Salford, Sheffield, and Warrington.

SCARLET FEVER MORTALITY.—RATE PER 1,000 LIVING.

	1891	1892	1893	1894	1895	Mean	1896
England and Wales.....	0·17	0·19	0·24	0·17	0·15	**0·18**	0·18
33 Great Towns	0·18	0·25	0·29	0·21	0·18	**0·22**	0·22
London.....	0·14	0·27	0·37	0·22	0·19	**0·24**	0·21
Manchester City.....	0·22	0·27	0·27	0·22	0·33	**0·26**	0·37
Manchester Township	0·22	0·35	0·23	0·26	0·37	**0·29**	0·41
North Manchester	0·22	0·39	0·39	0·18	0·24	**0·28**	0·24
South Manchester	0·23	0·16	0·23	0·22	0·35	**0·24**	0·41
50 Smaller Towns	0·22	...	...	...	...	...	...
67 Smaller Towns	...	0·20	0·20	0·16	0·16	**0·18**	0·20
Rural Districts.....	0·15	0·15	0·20	0·14	0·12	**0·15**	0·14

ON DIPHTHERIA.

No disease has more thoroughly eluded the researches of our most accomplished investigators than diphtheria. This has undoubtedly arisen, in large measure, from the fact that it is extremely difficult to be sure from ordinary medical examination that an illness has been diphtheritic after it has passed, and, indeed, often a diagnosis cannot be made when we have the opportunity of seeing the disease from the beginning. Many forms of throat affection, such as scarlet fever, septic affections of the throat, acute follicular tonsillitis, and quinsy, are capable of taking on the appearance of diphtheria; and, on the other hand, diphtheria is itself capable of appearing as the mildest and most harmless of affections. There is, it is true, one symptom which tells us that we are in presence of an outbreak of diphtheria, namely, the occurrence of diphtheritic paralysis. It is not, however, a frequent occurrence in most incidences of diphtheria, and the proportion of paralysis is very variable. It does not tell us anything definite about most of the cases, in which paralysis does not occur.

Now, a considerable degree of obscurity must necessarily remain about any disease when you cannot separate it from other affections, which may own widely different origins. Such is the case with diphtheria.

How much it has been possible to ascertain under these circumstances is admirably set forth in the Milroy Lectures for 1891 by Sir Richard Thorne Thorne, K.C.B. Most of the materials on which he draws have been

collected by trained inquirers, and, even in the absence of certainty, have a high degree of value. Yet, lucid as is the exposition, and able as many of the investigations have been, we are left at the end with a sense of non-fruition, owing, I believe, to the impossibility of arriving at a sufficiently solid footing as regards the nature of the disease.

A study of the distribution of diphtheria, as hitherto understood, led Dr. Thorne Thorne to the generalisation that a bleak, damp soil, especially when exposed to organic contamination, is favourable to the disease.

He is strongly of opinion that a mucous membrane is attacked by diphtheria only when previously injured, and that healthy throats resist the infection. He also adduces reasons for believing that, up to a certain point, there is a progressive increase of malignancy in the process of transference from one member of a family to another.

He does not entirely deny the influence of bad drainage and other insanitary conditions, but points out that these bad influences are least common in country districts, in which the disease preponderates.

Discussing the influence of schools in the propagation of diphtheria, he finds that at the school age children are specially liable; but that, in addition, aggregation in school favours its spread, or indeed any kind of aggregation, when the malady has once made its appearance. There is, in fact, no doubt about its transmissibility from person to person.

Investigations by Mr. Power and others have shown that milk may be the means of scattering diphtheria widely; that, in fact, we may have true milk epidemics.

The gradually accumulating observations of the Local Government Board investigators had prepared them to find that the disease might arise from some particular malady of the cow, and evidence is adduced in support of this view. The observations of Dr. Klein go to show that diphtheria may arise in cats, and that, in fact, it did so arise in connection with the cow disease alluded to. Dr. Charles Renshaw's observations also point in that direction.

For a brief statement of the author's views, I would refer to the summary at the end of the work on "Diphtheria: its Natural History and Prevention," by R. Thorne Thorne. London: Macmillan & Co., 1891.

I have already said that although a number of the observations relied upon have been made by good clinical observers, and sifted by trained inquirers, there must necessarily remain much obscurity about a disease which is often so little susceptible of exact diagnosis. Clearly much would be gained if the illness could be definitely stated to be true diphtheria, although it must be admitted that we are far from being able to look forward to such a consummation within a short period of time, over any considerable part of the country.

The aid which we may hope from bacteriology is, itself, not absolute and unconditional.

There is no doubt, it is true, that one particular micro-organism fulfils all the conditions necessary to identify it as the cause of a disease, which we must regard as true diphtheria. That is to say, it can be grown separately outside the body. A disease can be produced in animals by inoculation of the pure cultures; and, according to Roux and Yersin, when the dose is not too large, paralytic effects are produced corresponding to those occurring in human beings.

In fact, there seems to be no doubt that there is one particular disease, which may, it is true, be simulated by other conditions, which is caused by a particular microbe. If, however, we are to extend the investigations which Dr. Thorne Thorne expounds, it seems evident that this particular disease must be separated.

In the way of this discrimination there are some difficulties. In the first place, there is no doubt that in examining specimens from the throats of cases much depends on the care with which the medical attendant removes material for examination. In the second place, it is of consequence that the bacilli in the throat shall not have been killed by the recent application of a strong bactericide. Moreover, there is another bacillus which closely resembles that of true diphtheria, the so-called *pseudo-diphtheritic bacillus*. There is the more difficulty in this respect, inasmuch as the differences which exist between these kindred organisms are not always maintained.

These difficulties appear to have been exaggerated, so far at any rate as can be judged from the Owens College examinations. Disinfection of the throat is generally found not to have destroyed all the bacilli; while the *pseudo-diphtheritic bacilli* do not occur with sufficient frequency to invalidate conclusions obtained by including amongst cases of diphtheria those persons in whose throats they occur.

On the other hand we exclude, by bacteriological examination, the large class of cases commonly regarded as diphtheritic in which the micro-organisms present are of the nature of cocci, that is, are round instead of being rod-shaped. Clinically speaking, this class of cases includes all septic processes in the throat, scarlatinal throats, and quinsy. It is of the utmost advantage in hospital administration to have this separation made before the case is removed to hospital, since otherwise there is risk of such cases contracting true diphtheria in the hospital, while an unnecessary expense is often incurred in treating them in diphtheria wards. This class of diphtheroid throat is often characterised by the suddenness with which the illness has supervened, while true diphtheria is more gradual in its onset. This distinction, although broadly a good one, is not, however, by any means invariable, and it is, therefore, of the utmost value to have the aid of bacteriology in determining the real nature of the case, which it may be otherwise exceedingly difficult, and perhaps impossible, to settle with precision.

In spite of the great advantage derivable from treatment in the hospital, and in face of the great risk to life which diphtheria implies, it is much more difficult to get cases of diphtheria to hospital than it is to get cases of scarlet fever removed. Perhaps it is the clear presence of an eruption in the latter disease which determines the parent, as well as the medical attendant. Anyhow, it is the fact that cases of diphtheria are not easy to get removed. This is surely a matter for much regret, at all events so far as the poorer classes are concerned; but so it is.

There are thus at least two objects to be aimed at in obtaining the examination of specimens from the throats of persons suspected to be suffering from diphtheria—viz., first, to see whether any more light can be obtained on the circumstances under which diphtheria arises; and, secondly, to add definiteness to administrative procedure in the matter of isolation and disinfection, as well as in the admission of cases into the diphtheria wards of the hospital.

So far as the facilities offered to practitioners have been used, the latter object has been most amply and satisfactorily attained. As will be seen, no advance has as yet been made in our knowledge of the etiology of the disease.

It may be mentioned, however, that previous to the inauguration of bacteriological examination in Manchester, the large majority of cases admitted into Monsall supposed to be suffering from diphtheria were believed, on the clinical evidence, not to have that disease. The results of bacteriological examination are in accord with the conclusions come to at the hospital. I do not in the least wish to imply that such would be found to be generally the case. Indeed, in New York and Boston, and as near home as Stockport, a much higher proportion of the cases have been found to be true diphtheria. But I am inclined to suppose that the difference is due, in no small measure, to the wish on the part of Manchester practitioners to have doubtful cases cleared up, and all necessary measures of precaution taken.

The first city in which bacteriological examination was publicly practised was New York, followed speedily by Boston. In the former city at least, and I presume also in the latter, this procedure is now part of the sanitary administration of the city, and a medical inspector assists the practitioners in obtaining specimens for examination. In these cities, however, the disease is much more prevalent than it is with us.

Shortly after, Dr. Robertson, of St. Helens, proceeded to follow a similar course of action in that town, and from the well-known skill and accuracy of that observer, any results which he may deduce from his examinations will be certain to be of special value.

His example was followed by Bristol, and the Medical Officer of Health for that city has published an exceedingly interesting account of his work, to which I shall have occasion again to refer.

In 1895 Dr. Porter, of Stockport, made arrangements with Professor Delépine for the examination of cases from that town, and in the beginning of 1896 the Sanitary Committee of Manchester made a like arrangement, an arrangement which I recommended in my Report for 1894.

There is another point of view which I have not considered it necessary to place before the practitioners of Manchester, since it more particularly concerns their relation to their patients; but it is none the less a very important one. The experience of numerous hospitals has made it abundantly evident that the treatment of true diphtheria, at an early stage, with antitoxin is highly successful, and is calculated greatly to diminish the terrible fatality attending the disease. Antitoxic serum has, however, by virtue of its origin, no effect on affections resembling diphtheria—certainly no favourable effect. Hence one would imagine that it would be regarded as a boon of the highest order to have the opportunity of determining the nature of the disease at the very earliest period, in order to ascertain the cases which may be expected to benefit by treatment with antitoxic serum. Such, no doubt, is the view that many take; but I must add that, where the circumstances are not suitable for such treatment at home, it does appear to me that no effort should be omitted to induce the guardians of children to send the patient to the hospital for treatment as soon as the nature of the disease has been ascertained.

At the Metropolitan Asylums Board Hospitals also provision was early made for the bacteriological examination of specimens from the throat of patients sent in as suffering from diphtheria, an arrangement which offers some advantages, but which I do not consider so useful as examination previous to admission.

It is, however, of utility that provision should be made for the examination of cases previous to discharge.

When we commenced this work in Manchester, I had not read the admirable report issued from the New York Health Department on their first year's experience, and, consequently, the conditions under which samples were taken, which were, in our respective spheres, devised by Professor Delépine and myself, were entirely independent. It has been, therefore, interesting to find that, as regards the facilities offered to practitioners, our plan of procedure has been almost exactly alike. The general conception has been, in both cases, to remove every possible difficulty which medical men might feel in the way of taking samples.

Where any difference in the administrative procedure has occurred, generally speaking, we have inclined towards the New York methods.

There are many points in the New York report of interest both to practitioners and the public, of which I will mention one or two only.

There has been a considerable amount of discussion as to the extent to which membranous croup, or, what comes to nearly the same thing, croup,

is true diphtheria. It is therefore of much importance to find that in the cases where the membrane was confined to the larynx, or bronchi, diphtheria bacilli were found in 167 instances, as against 27 in which it was not found. This is a much higher proportion than for throat cases, and we must infer that, in New York at all events, membranous croup is generally diphtheria.

A second point of much importance is the length of time during which the bacilli persist in the throat.

The investigations of the New York observers go to show that the virulence of the bacilli is lost within a short time after the disappearance of the membrane. The bacillus was found to be present, however, for a much longer period, in one case 44 days, in another 42 days, after disappearance of the membrane. It is evident, then, that even in slight cases isolation should be maintained for at least a month after the patient appears to be well, and, further, that cases should be tested before discharge, especially in private practice.

The Bristol experience points in the same direction.

How far are the cases rejected on bacteriological examination, as not being diphtheritic, of an infectious character?

It was found, as might be expected, that in over 10 per cent. some evidence of infection was present. Such evidence, however, pointed for the most part to scarlet fever; and, indeed, it is plain that in rejecting cases appearing to be diphtheria, we must be careful not to neglect possible occurrences of scarlet fever or other infectious disease.

One of the problems discussed in the New York report is the origin of cases of diphtheria. How is infection transmitted?

We do not, however, receive much light on the subject. It is true, cases are quoted in which infection appeared to have persisted for prolonged periods. The disease appeared to spread by what is called "neighbourhood" infection, and again by schools. Cases are given showing seeming arbitrariness in the selection of victims as well as in the means of communication.

It is probable, indeed, that the contention already mentioned, that children with healthy mucous membranes do not contract disease, is, in the main, a correct one; and, further, that infection may be conveyed by scraps of dried mucous or membrane detached from the mouth of an infected person, and in some way, probably as dried material, carried to the mouth or nostrils of a susceptible person.

A question of great moment is the liability of cats and other domestic animals to contract and disseminate diphtheria. Dr. Dowson, who made the bacteriological examinations for Dr. Davies in Bristol, believes that from the bodies of two cats which were ailing in connection with cases of diphtheria he has isolated cultures of the micro-organisms of diphtheria.

So far, similar investigations in Manchester have yielded negative results.

During the year 1896, 181 suspected cases of diphtheria were submitted to bacteriological examination. Of these, 85 gave positive results. I have therefore subjected to analysis these as well as the cases in which no examinations were made. With regard to the latter it is necessary to remember that owing to delay in taking materials for examination, death frequently occurred before a specimen could be obtained. There is no reason why a specimen should not afterwards be taken. Generally speaking, however, this has not been done.

I propose, now, to keep in a separate class those with regard to which the result of the examination has been positive.

First, then, as regards distribution of the disease, the cases known from bacteriological examination to be diphtheria were distributed in districts as follows : —

	Ancoats	Central	St. George's	Cheet-ham	Crump-sall	Blackley	Harpur-hey	Moston	Newton
Number in Districts	3	8	9	8	5	3	4	4	4
	Bradford	Beswick	Clayton	Ardwick	Open-shaw	West Gorton	Rusholme	C.-on-M.	Hulme
	4	1	3	1	6	3	3	6	10

Taking into account the fact that there were in 1896 a considerable number of cases not examined who must have had diphtheria, and the difficulty of drawing conclusions from numbers so small, we cannot go further than to say that no part of the City is exempt from the disease.

As regards the age and sex of these cases, we find that they were constituted thus :—

	Ages 0—	5—	15 and upwards
Males	19	16	8
Females	16	16	10

The greatest incidence is thus antecedent to the school age—three of the males under five attend school, but, on the other hand, three of the males over five were at home. All the females over five were at school, while three of those under five were at school.

When, now, we inquire into the history as regards infection, we find a singular sparsity of infective histories.

Allowing for imperfection in the work of tracing the cases, and merely comparing with the history of scarlet fever and typhoid fever, this is a singular and striking circumstance. The number of cases is not small, and each case is believed to be carefully enquired into on definite lines.

The histories obtained are these :—

1 f. æt. 3.—Lodger. The landlady had just got over a "quinsy."

2 m. æt. 5.—There was a previous case of measles or scarlet fever in this house.

3 m. æt. 9.—From a previous case. Interval, 10 days.

4 m. æt. 5.—Contracted in Hospital.

5 m. æt. 8.—Mother has had sore throat. No bacilli in specimen from throat of mother.

6 m. æt. 9.—From a previous case. Interval, 10 days.

7 f. æt. 7.—Contracted at Convalescent Home.

8 m. æt. 3 —A simultaneous case of sore throat in the house.

9 m. æt. 6.—From a sister age 3.

10 f. æt. 15.—Said to have been contracted from another case in the same neighbourhood about seven days before.

11 f. æt. 6.—From previous case. Interval, 15 days.

12 f. æt. 4.—Father had sore throat two days before.

13 f. æt. 3.—From a previous case not in the house.

14 f. æt. 16.—Contracted outside the City.

15 f. æt. 6.—Contracted away from home, at a house where a child has died of diphtheria.

16 f. æt. 23.—There has been a case of sore throat next door.

17 m. æt. 17.—Landlady's two boys had sore throat about six weeks before.

18 f. æt. 5.—From sister, æt. 10. Interval, one day.

19 f. æt. 6.—From sister, æt. 3, who died. The latter not examined.

20 f. æt. 22.—From f. æt. 19.

It will be seen that none of these histories of infection point to the school. That schools do, from time to time, play a powerful part in the spread of diphtheria we have every reason to believe, both from what we know of the disease, and from such direct evidence as we possess. That is not, however, the history of diphtheria in Manchester in 1896. It might be supposed that we were ignoring cases not bacteriologically examined. As a matter of fact, these have been amply allowed for both in their relation to the cases just considered and separately on their own account.

When we inquire into the condition of the domestic animals, such as cats and dogs, kept in the affected household, we find that in only one of the above instances in 1896 was one of these animals found with any appearance or history of bad health.

It is equally impossible to suppose that the milk could have been to any material extent responsible for these cases, unless we must suppose that the conditions leading to diphtheria are very widely distributed in shippons, and may affect only one person here and there. This appears, at first view, a wild and improbable hypothesis, and at present, therefore, we are bound to put it aside as a remote possibility.

There is, therefore, no possibility in these cases, with the information before us, of tracing the infective chain by which these cases are connected with previous occurrences of diphtheria, and we therefore proceed to ask whether there is anything in the sanitary circumstances of the house which would favour the development of this disease.

There are certainly many sanitary defects associated with these cases. Sanitary defects are not, however, confined to the houses in which cases of diphtheria have occurred; and as regards one large class of sanitary defects, viz., those associated with sewer gas, as Dr. Thorne Thorne has pointed out, they are absent in many country districts where diphtheria is prevalent. On the other hand, defective drainage is apt to lead to the very condition which is produced by absence of drainage, viz., a localised pollution of the soil with foul organic liquids.

Now such a condition of the soil will be produced in Manchester if the urine guide is absent or corroded, if the closet floor is wet, especially if close to the dwelling, if the slop pipe is short, if the drains are defective, or if there is a midden privy attached to the house.

Out of the 85 cases, 40 are not associated with such conditions. In four of these, however, there is a history of infection, in five the pail adjoins the house, in two the yard was defective (one of the houses is back-to-back), in another pigeons were kept, in two instances the disease was contracted outside Manchester, leaving 25 cases in which no adverse conditions of the above nature were found.

The number of defective slop pipes, which is a condition that I have been inclined to suspect as having some connection with the production of diphtheria, is specially noticeable.

An examination of the insanitary conditions associated with cases of diphtheria certainly creates the impression that a connection exists between the disease and the retention in the soil adjoining houses of foul liquids. The connection may, however, be an indirect one, presuming that it exists, and it may be that such conditions are chiefly operative by producing a diseased condition of the mucous membranes liable to diphtheria.

We have seen that the individual histories of cases give us no reason for suspecting any school as having served as a focus for the spread of the disease. An examination of the schools from which the cases have come shows that the disease has not continued to arise in any one school.

It may be surmised, and I do not wish to dispute the idea, that a more careful investigation would have thrown more light on the origin of the cases. The investigation, such as it is, is all that we can expect from our Sanitary Inspectors.

I cannot say that I am entirely satisfied that domestic animals have not had to do with the continued presence of the disease. Possibly food may

have something to do with it. We can only ponder over the continued facts that we are receiving, investigating when a clue to the elucidation of the difficulties presents itself.

I have said that our results as administrators are much more satisfactory than those which we have obtained as inquirers, and that the clinical diagnosis at Monsall of cases admitted into the Hospital is in general accord with the results of the bacteriological examinations. How far the clinical diagnosis is borne out by the bacteriological examination can very well be determined when we know the independent results of observation at the Hospital and at the College. We have also in the initial symptoms of the patient, and in the manner of onset of his illness, a very useful guide. Diphtheria, as contrasted with scarlet fever and acute follicular tonsillitis, is usually gradual in its inception; and although we cannot thus separate catarrhal affections from diphtheria, still the distinction is one of practical value, especially if we have regard to the extremely sudden manner in which scarlet fever often begins. The manner of onset was not recorded at the commencement of 1896, so that this point has only been observed for 56 of the cases. The onset was gradual in 40 of these, sudden in 9, and in the remaining 7 was either not noted or could not be described positively one way or the other. It will be seen, then, that where the question is between scarlet fever and diphtheria, a substantial amount of control is obtained from this distinction, especially as scarlet fever is in the great majority of instances very sudden in its onset.

I have not been able to obtain a subsequent history of the cases yielding diphtheria bacilli on examination as regards the occurrence of paralytic complications, but Dr. Marsden has furnished me with a statement of the complications observed in hospital, from which it is evident that paralytic sequelæ are not of very frequent occurrence. The number of cases of diphtheria treated in Monsall Hospital during the year 1896 is given as 47, and paralytic phenomena were observed in eight of them. If we reject cases of cardiac paralysis or failure, the number was five, or 10·7 per cent.

We must infer that paralysis has occurred in a number of those treated at home. So far, however, I have been able to get no information on the subject.

In order that no improper inferences should be made as regards the connection between cases of diphtheria and insanitary conditions, or as regards any other particular, I have had a similar analysis made for the cases which have been diagnosed as other than diphtheria. With the exception of 16, these, numbering 102, have been examined bacteriologically; 11 of the 16 were removed to hospital before the examination at the College was begun, nine of them were diagnosed as tonsillitis, one as scarlet fever, and one as phthisis. In only a few of the subsequent cases has a positive diagnosis been made. They include five cases of tonsillitis, one of scarlet fever, one of nasal catarrh, one of measles, one of phthisis, and one of acute laryngitis.

The number of negative examinations were, therefore, 86 as against 85 positive. To these we must add ten negative results, in which the practitioners adhered to their diagnosis, making in all 96 negative as against 85 positive cases.

In order to avoid any possibility of mistake, the medical attendant is in all cases asked to give his final opinion on the cases after the bacteriological examination has become known to him, and it is very satisfactory to find that the result of the bacteriological examination is generally unhesitatingly accepted. Where it is not accepted a subsequent examination is made, or the opinion of the medical attendant is acted on.

Safeguarded in this way, the bacteriological examination has resulted in a considerable and legitimate diminution in the expense of disinfection and treatment in hospital.

When we examine the particulars relating to cases not diphtheria, we find that the insanitary conditions attaching to the houses are but little different from those in cases of undoubted diphtheria. It is not, therefore, to be inferred that these conditions have nothing to do with the production of diphtheria, inasmuch as they may have, and no doubt do have, to do with other conditions resembling diphtheria in some of their clinical aspects.

In 71 instances the onset is described, and we find that in 35 it was sudden, while in 36 it was gradual. This distribution is in accord with the mixed character of the cases which put on the semblance of diphtheria.

In nine of the cases exposure to infection of some kind is noted, while the proportion recorded of those subject to sore throat is much higher than was the case with those giving diphtheritic growth, as might be expected.

In 37 instances out of 85, conditions were noted similar to those which were found in connection with diphtheria, and which might be supposed to lead to a polluted condition of the soil.

This is not quite so high a proportion as in the cases of true diphtheria.

As regards fatality, it will be noted that amongst the cases examined, and yielding cultures of the bacilli, there were 15 deaths, besides 30 of others not examined, during the period of specimens being examined.

Amongst those giving a negative result, however, not a single fatality occurred.

As regards the distribution, according to age and sex, we find that the negative cases were distributed as follows :—

Males.				Females.			
0-	5-	15-	Total.	0-	5-	15-	Total.
8	12	13	33	7	15	31	53
Of the 12, 3 were not attending school.				Of the 15, 2 were not attending school.			

This much more nearly approaches the usual age distribution of cases reported as diphtheria than do the figures of cases diagnosed bacteriologically as diphtheria, and it will be interesting to see what larger figures will yield.

There is here, again, no evidence of school influence.

Females above the age of 15 are affected with diphtheroid sore throat to an extent more than double of what men are.

So far, then, as these figures go, young children at home appear to be exceptionally subject to true diphtheria. Were this confirmed by larger experience, we should have to infer that insanitary conditions in and about the house may play an important part in the causation of the disease.

For this larger experience we shall have to wait, and it is useless at the present stage to discuss what the important home influence may be until the facts are better substantiated.

In none of the negative instances had any conditions of bad health in domestic animals been noted.

As regards membranous croup, the number of cases reported in 1896 was 39, of whom 26 died. Considering the results obtained in New York, it is a great pity that bacteriological examinations could not be obtained in these cases. Only one case was examined, which gave a positive result.

Analysed according to age and sex, these cases are thus distributed :—

Males.				Females.			
0—	5—	15—	Total	0—	5—	15—	Total
17	2	0	19	17	2	1	20

This distribution approximates to that of the cases bacteriologically found to yield the bacillus diphtheria.

As regards insanitary conditions of the kind mentioned in connection with diphtheria, these were present in 22 instances, and altogether these deaths occurred under associations worse than prevailed either in diphtheria or with diphtheroid sore throat.

In none of the cases reported as membranous croup had bad health been noted in domestic animals. In three cases the disease was associated with measles, in one with whooping cough, and in one with scarlet fever. In one case only was direct infection traced.

I append the customary tables, showing the distribution of cases reported as diphtheria throughout the City, and the fatality of the disease at different ages, so far as such small numbers can show anything.

Diphtheria, Membranous Croup.—Rates of Attack, 1896.

Districts of Manchester	Attacks	Attack Rate per 1,000 living	† Case Fatality, per cent.	Hospital Removals, per cent.
Ancoats	10	0·21	20·0	10·0
Central	13	0·35	46·2	46·2
St. George's	24	0 37	25·0	20·8
Cheetham	28	0·90	39·3	35·7
Crumpsall	7	0·75	14·3	14·3
Blackley	8	1·00	37·5	25·0
Harpurhey	11	0·96	63·6	...
Moston	7	1·09	28·6	...
Newton Heath	17	0·46	11·8	11·8
Bradford	7	0·31	28·6	14·3
Beswick	3	0·28	33·3	...
Clayton	7	1·73	...	...
Ardwick	11	0·29	36·4	18·2
Openshaw	15	0·50	20·0	13·3
Gorton (West)	14	0·51	57·2	14·3
Rusholme and Kirk.	8	0·41	12·5	12·5
Chorlton-on-Medlock	27	0·43	18·5	11·1
Hulme	22	0·30	40·9	27·3
City of Manchester	**239**	**0·44**	**30·6**	**18·4**

† Corrected : the fatal cases are those occurring amongst the cases actually notified.

Diphtheria, Membranous Croup, 1896.

Ages	Attacks	Deaths	Case Fatality, per cent.
Under one year	10	7	70·0
1 to 2 years	21	16	76·2
2 to 3 ,,	23	15	65·2
3 to 4 ,,	28	12	42·8
4 to 5 ,,	30	13	43·3
5 to 6 ,,	26	3	11·5
6 to 7 ,,	8	2	25·0
7 to 8 ,,	7	1	14·3
8 to 9 ,,	2	...	...
9 to 10 ,,	11	...	...
10 to 15 ,,	16	...	...
15 to 20 ,,	21	3	14·3
20 to 25 ,,	10	...	...
25 to 35 ,,	14	...	...
35 to 45 ,,	8	1	12·5
Over 45 ,,	4	...	...
All ages	239	73	30·6

Percentage of Deaths in Cases of Diphtheria at Different Ages, 1891–2–3–4–5–6.

Ages	Attacks	Deaths	Case Fatality
Under one year	86	63	73·3
1 to 2 years	221	151	68·3
2 to 3 „	231	138	59·7
3 to 4 „	266	131	49·2
4 to 5 „	229	96	41·9
5 to 6 „	190	71	37·4
6 to 7 „	100	28	28·0
7 to 8 „	98	22	22·5
8 to 9 „	81	15	18·5
9 to 10 „	77	10	13·0
10 to 15 „	284	17	6·0
15 to 20 „	249	14	5·6
20 to 25 „	188	5	2·7
25 to 35 „	249	7	2·8
35 to 45 „	119	2	1·7
Over 45 „	60	2	3·3
All ages	2,728	772	28·3

Diphtheria Mortality.—Rate per 1,000 living.

	1891	1892	1893	1894	1895	Mean	1896
England and Wales	0·17	0·22	0·32	0·28	0·25	**0·25**	0·29
33 Great Towns	0·21	0·27	0·43	0·38	0·36	**0·33**	0·38
London	0·34	0·46	0·76	0·62	0·53	**0·54**	0·60
Manchester City	0·25	0·25	0·35	0·29	0·21	**0·27**	0·15
Manchester Township	0·26	0·32	0·30	0·27	0·16	**0·26**	0·13
North Manchester	0·40	0·30	0·38	0·37	0·37	**0·36**	0·23
South Manchester	0·17	0·18	0·37	0·24	0·16	**0·22**	0·12
50 Smaller Towns	0·13	...	...	...	..	...	...
67 Smaller Towns	...	0·15	0·19	0·19	0·23	**0·19**	0·25
Rural Districts	0·15	0·16	0·24	0·24	0·19	**0·20**	0·23

DIPHTHERIA AND MEMB. CROUP.—RATES OF ATTACK PER 1,000 OF POPULATION.

	1891	1892	1893	1894	1895	Mean	1896
Twelve Notification Towns ...	0·46	0·53	0·54	0·51	0·47	**0·50**	0·62
City of Manchester	0·90	0·97	1·20	0·98	0·76	**0·96**	0·44
Manchester Township.....	0·79	0·95	0·90	0·73	0·48	**0·77**	0·32
North Manchester	1·35	1·23	1·45	1·48	1·39	**1·38**	0·67
South Manchester	0·72	0·84	1·25	0·85	0·58	**0·85**	0·39

From the above table it will be seen that the case-rate in North Manchester was more than double that in either of the other divisions.

ON TYPHOID FEVER IN 1896.

The year 1896 has produced some very important work in connection with typhoid fever.

In the foreground must be placed the discovery by Widal of the applicability of certain specific changes in cultures of the typhoid bacillus in presence of the serum of immunised animals to the diagnosis of cases of tyhoid fever. Up to the beginning of 1896 these changes had been used for the recognition of the bacillus of typhoid fever, an application which was uncertain and incomplete.

Widal reversed the process, and used well-tested cultures of the bacillus to determine whether a very small quantity of blood taken from a patient showed in that person the presence of typhoid fever or not. This application of previous work is precise, and is, I understand, with care, reliable.

When, in June, 1896, Dr. Widal announced his discovery, Professor Delépine lost no time in testing his methods, and shortly after informed me that he believed a test had been discovered for the diagnosis of typhoid fever which could be made available for public health work. In a disease of the importance of typhoid fever, and one which presents so many difficulties, this communication was one which could not fail to awaken a lively interest and expectation. It appeared to Professor Delépine desirable, as a preliminary step, to subject the new method of diagnosis to as severe an examination as possible, and also to ascertain the difficulties which were likely to arise in connection with its practical application. With this view, a number of specimens of blood were submitted to him by Dr. Marsden from cases of fever in Monsall Hospital. It was thus possible to compare the bacteriological diagnosis at Owens College with the clinical diagnosis worked out at the hospital, and, in effect, the results were surprisingly accordant.

In fact, when 50 cases had been examined, no doubt was left that an exceedingly sharp and delicate test for the presence of typhoid fever had been discovered. Moreover, the preliminary investigation thus carried out enabled Professor Delépine to perfect the method of examination, and to ascertain and remove several sources of doubt and error which have, it may be supposed, troubled other inquirers.

On the completion of this series of observations it was evident that the time was ripe for offering to practitioners the advantages of accurate diagnosis which they indicated, and I therefore placed the conclusions arrived at before the Hospitals Sub-Committee, who instructed me to enter into arrangements with the Council of Owens College and with Professor Delépine to have examinations made of the blood serum from cases of typhoid fever on the same basis as had been previously made for diphtheria. In consequence, an agreement was arranged for the test to be applied, and the practitioners of Manchester, as well as the public, were thus enabled in the beginning of 1897 to have the benefit of this very useful discovery—a benefit for which they have to thank Professor Delépine and the Owens College, as well as the Sanitary Committee of the Manchester Corporation. It is so manifest that this work, initiated by Professor Delépine, is mutually useful to the College and to the Public Health Department of the City, while it is calculated to be a great boon to the public, that we have a right to congratulate ourselves on the success with which it has been carried on.

On the conclusion of the arrangement with Professor Delépine and the Council of Owens College, the following circular was issued to the medical men of the City, accompanied by directions for the taking of samples, drawn up by Professor Delépine :—

Public Health Office,
Town Hall, Manchester,
January 8th, 1897.

Dear Sir,

At a meeting held on Wednesday the 30th December, 1896, the Sanitary Committee of this City confirmed a resolution, passed by the Hospitals Sub-Committee, that facilities be afforded to medical men in the diagnosis of cases of typhoid fever. The investigations of Widal, whose results have been confirmed by Professor Delépine, make it certain that, by means of a small amount of blood, such that the loss of it can make no appreciable difference to the patient, it is easy to tell by a bacteriological reaction whether the patient is suffering from typhoid fever or not. Now by clinical examination it is often very difficult, in the early stages of the disease, to say whether an illness is or is not typhoid fever.

In consequence of this difficulty, cases are not notified sufficiently early to the Public Health Office to enable the Medical Attendant and the Sanitary Authority to take the most effectual measures for preventing communication of the disease from the sick person to members of the same family and to others. Not only so, but many persons are sent into hospital as suffering from typhoid fever who are really affected with other conditions.

Then, moreover, there is no doubt that if the circumstances of the sick are such that they ought to be treated in hospital, it is much better for them that they should be removed from home early in the course of their illness.

All these considerations make it matter for great congratulation, both to the Medical Attendant and to the public, that bacteriology should lend effectual aid in clearing up doubtful cases of this most difficult malady; and the Sanitary Committee have, therefore, made a similar arrangement with the Council of Owens College, and with Professor Delépine, to that which has worked so well in the case of diphtheria.

A number of pipettes are kept at the Public Health Office in the Town Hall, by means of which a small amount of blood may be obtained from a suspected case for transmission to Professor Delépine at Owens College. Accompanying each pipette is a paper containing instructions for the obtaining of material, and particulars requiring to be filled in.

Medical men are requested to be careful to fill in the particulars asked for, as no bacteriological examination will be made in the absence of sufficient information.

Should the bacteriological examination indicate that the case is not one of typhoid fever, the fee of 2s. 6d. for notification will be paid, just as if no bacteriological examination had been made.

On the other hand, if no bacteriological examination is requested, this will be regarded as a proof that the case reported admits of no doubt. Applications for pipettes must be made to the Public Health Office. The pipettes must afterwards be forwarded direct to Professor Delépine at Owens College. The diagnosis, again, can only be obtained from the Public Health Office. Professor Delépine wishes this to be clearly understood.

It is, however, the aim of the Sanitary Committee to shorten, as much as possible, the period between the first report of the case and the receipt by the Medical Attendant of the bacteriological diagnosis.

If the Medical Attendant will telephone to the Public Health Office, from the nearest police station, a request for a pipette, this will be at once sent by messenger to his residence, or to the address of the patient, as the Medical Attendant may desire. If he is prepared at once to take a specimen for diagnosis, the messenger will wait to receive the pipette from him, charged with the matter to be examined, and will

convey it forthwith to Professor Delépine. The diagnosis will be given, to the Medical Attendant only, on the following day. It will be necessary, however, that the pipette reach Professor Delépine by 1 p.m. on any one of the days Monday to Friday, and on Saturday by 10 a.m., otherwise the diagnosis will be delayed by one day. No diagnosis will be given on Sunday.

The expense of the bacteriological examination will be defrayed by the Corporation, and it is hoped that full advantage will be taken of the opportunities thus afforded at the earliest possible period of the illness.

As the bacteriological diagnosis is more difficult during the first week of the disease, a second tube should be sent after the first week, if a negative result has been obtained within the first seven days after the beginning of the symptoms.

In order that medical men may familiarise themselves beforehand with the procedure which they will require to adopt, a copy of Professor Delépine's instructions for taking material is enclosed.

MEDICAL OFFICER OF HEALTH.

The following are Professor Delépine's instructions for taking samples of blood for examination :—

Directions for taking a Sample of Blood for purposes of Sero-Diagnosis.

1. The skin of the back of the index or middle finger is first washed with soap and water; then, whenever time permits, it is sterilised by the application of a small compress of perchloride of mercury solution 1/500, or carbolic acid lotion, or liquor-calcis chloratæ (B.P.), for about ten minutes, diluted with an equal amount of water.

2. Meanwhile the finger can be prepared by causing congestion in one of the usual ways, *e.g.*, by tying a piece of tape, not too tightly, round the root of that finger.

3. Whilst the disinfection is going on, the case containing the pipette is opened by lifting one of the plaster lids, and the pipette is removed. About one-sixteenth of an inch of the sealed point is broken off with a pair of forceps, or otherwise. The point is sterilised by passing it two or three times through the blue flame of a spirit lamp, or for a few seconds *just above* an ordinary gas, candle, or match flame. (A deposit of soot on the glass should be avoided.)

4. The antiseptic compress should now be removed from the finger.

5. The antiseptic solution remaining on the skin should be removed by washing with a little spirit.

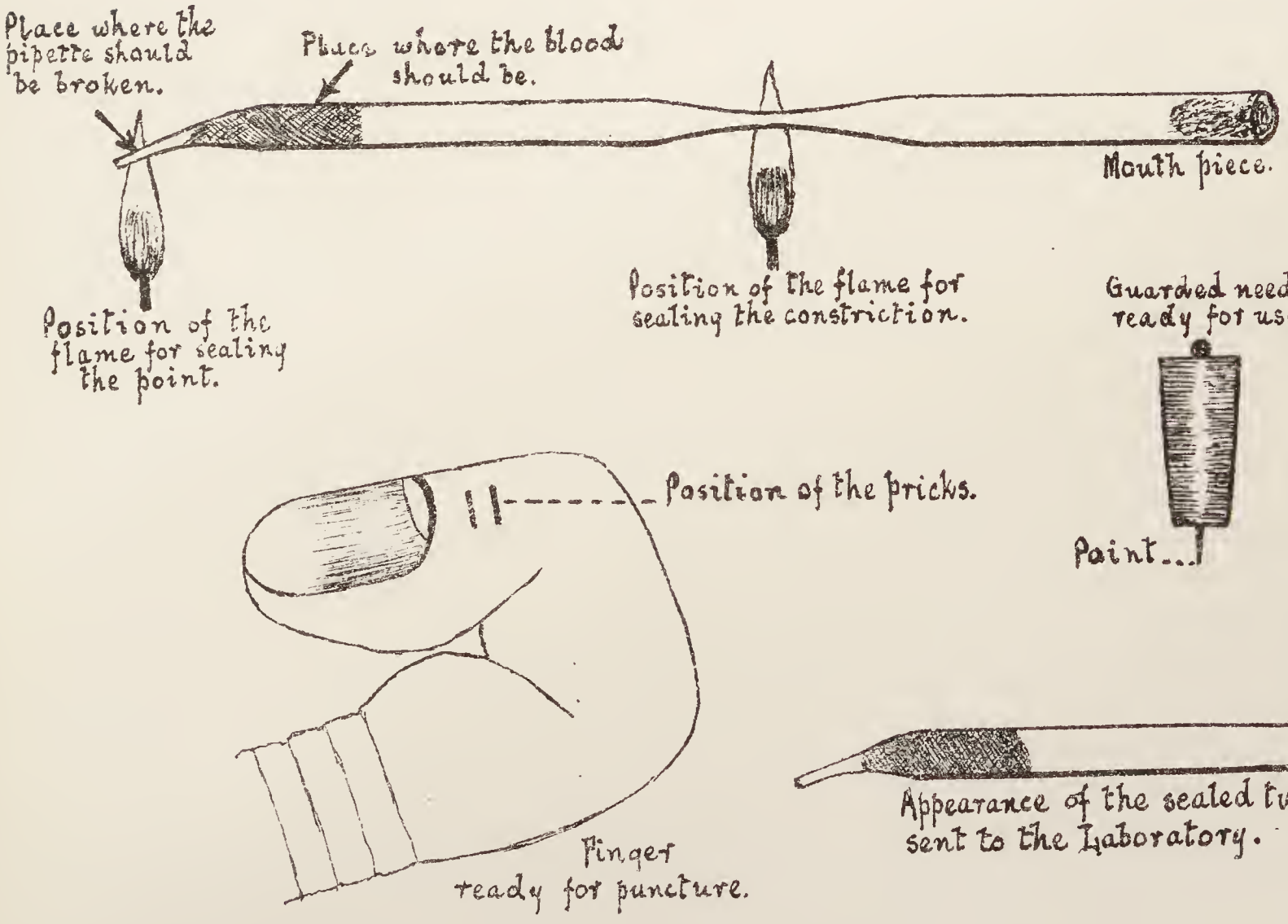
6. The patient should be made to flex the finger as much as possible. The tightened congested skin, just above the root of the nail, should now be sharply pricked with the mounted sterilised needle, which is provided with the pipette. A pretty deep puncture can be made with a sharp needle without the patient feeling it much.

7. A large drop of blood is allowed to accumulate over the puncture; the portion of skin which has been pricked must, of course, be kept as horizontal as possible.

8. With the pipette, which is now cold, held horizontally, and without removing the cotton plug from the mouthpiece, as much blood as can be obtained is allowed to run in. By squeezing the sides of the finger, a second and sometimes a third large drop of blood may be obtained. All this should be allowed to run into the pipette.

9. After driving the blood away from the broken point of the pipette by aspiration or gentle shaking, the end of the pipette is sealed by holding it in a gas, lamp, candle, spirit, or match flame, so as to heat to redness not more than one-sixteenth of an inch. The point should be held in the flame till it is quite closed.

10. The constricted part of the pipette is then broken, and sealed in the same way. The manner in which these directions are to be carried out is explained by the following sketches :—



11. The tube containing the blood and the mounted needle are replaced in the case, which is again closed with the plaster lid.

12. All particulars are now entered on the label pasted on the case, and the case is enclosed in a stamped envelope, addressed—"Professor Delépine, Bacteriological Laboratory, Owens College, Manchester."

I do not propose here to elaborate this matter, as a special statement or statements will be made on the whole subject by Professor Delépine and myself, dealing with our respective parts of the subject. I may say, however, that full advantage has been taken by practitioners of the offer made by the Corporation.

Another matter of much importance in connection with this disease is the condition of the oyster fisheries. In the course of the investigations made by the Local Government Board into the distribution of Asiatic cholera in 1893, it became apparent that there were good reasons for attaching suspicion to the oyster layings at Cleethorpes, near Grimsby, as being concerned in the propagation of the disease.

So far as concerns typhoid fever, the whole subject has been admirably investigated for this country by Dr. H. Timbrell Bulstrode, in a report to the Local Government Board, which supplies a very readable and clear account of all the principal oyster fisheries on our coasts.

In his introduction to this report, Sir Richard Thorne Thorne summarises the knowledge so far obtained on the subject, while giving an account of bacteriological investigations by Dr. Klein into the manner in which the infective matter of typhoid fever and cholera are influenced by oysters, as well as into the occurrence of these germs in oysters.

The subject is beset with difficulties, the bacteriological part of the work being especially troublesome, and it will at present, therefore, probably be sufficient to indicate a few points which have been clearly made out, and which demand attention from an administrative point of view.

In the first place, the inquiry carried out by Professor Conn into the occurrence of an outbreak of typhoid fever at Wesleyan University, Connecticut, made it perfectly clear that the cause of this outbreak was the consumption of oysters which had been exposed to specific contamination by sewage, and demonstrated beyond possibility of doubt that this is one of the methods by which typhoid fever is propagated.

A considerable amount of evidence to the same purpose, though of a less conclusive nature by itself, has been collected by a number of observers both at home and abroad. The nature of this evidence is thus stated in the introduction to the Local Government Board Report on Oysters :—

"Enteric fever has been ascertained to have followed on the consumption "of raw oysters. The interval between such consumption and the onset of the "symptoms has corresponded with the incubation period of the disease. The "special incidence of the fever has been on those who were known to have "partaken of the oysters, whilst others who could only be differentiated "from the sufferers in that they had not partaken of the oysters, escaped. "The consumption of oysters has been ascertained by a process of exclusion "to have been the only medium through which such a disease could have "been simultaneously communicated to the sufferers ; and at times the oysters "in question have been found to have had opportunity of contamination by "human excreta, even by specifically infected excreta."

The bacteriological investigations of Dr Klein, for the Local Government Board, and of Dr. Cartwright Wood go to show that both the typhoid bacillus and the cholera spirillum can live in sea water, and in contact with the external surface of oysters for some weeks. There is, however, no evidence of multiplication in sea water. At the same time, it would be unsafe to assume that this may not occur. As Dr. Bulstrode has related, under certain circumstances a considerable destruction may occur amongst oysters, and it is possible from what we know of the typhoid bacillus that the slime so produced may, under favourable circumstances, serve as a soil for the typhoid bacillus to grow upon. Then, moreover, as Dr. Cartwright Wood has pointed out, the oyster liquid and substance, supposing the oyster to have died or to have become enfeebled while in the hands of the oyster merchant, may serve as a favourable medium for the growth of specific bacteria.

In proving that oysters or other shell fish, eaten raw, have been the means of communicating typhoid fever, the greatest difficulty has been the possibility of excluding other sources of infection. This difficulty, however, was completely removed in Professor Conn's investigation, which has added greatly to the value of other observations, in themselves less convincing.

Amongst those who have collected valuable evidence of this auxiliary nature may be especially mentioned Dr. Arthur Newsholme, of Brighton, and Dr. Jasper Anderson, of Blackpool.

It must, indeed, be very rare for the distribution of disease by oysters to be otherwise than very scattered and partial, a circumstance which greatly adds to the difficulty of obtaining complete proof of infection.

There are, in any case, sufficient facts to attach the greatest suspicion to the use of raw shellfish in the production of disease, and it is probable that careful investigation would greatly extend our information.

Under these circumstances the actual condition of oyster beds and storage ponds must be taken as, to a large extent, decisive of the question of infection. Hence the complete account which Dr. Bulstrode supplies of the conditions under which oysters are grown, stored, fattened, and sent to market is of the utmost interest and importance.

It appears that while we have, fortunately, large fisheries which are practically beyond suspicion, in others, some of them large ones, the conditions are such, especially in the fattening ponds, as almost inevitably to lead to the production of disease. So strong indeed has this opinion become in Brighton that the Corporation, under the guidance of their Medical Officer of Health (Dr. Newsholme), felt it to be their duty to lay before Parliament a Bill dealing with the subject, while more recently they have been pushing general legislation in the same direction.

It appears to me that the most effectual way to deal with our home fisheries is for the Legislature to enforce such general conditions as regards the treatment and disposal of sewage, and as regards the purification of oysters and other shellfish, before being put on the market, as will remove all danger. At the same time, precautions will require to be taken to prevent contamination of the shellfish, as well as injurious changes, while the oysters are being kept for sale.

There is no question that the consumption of shellfish, both raw and cooked, is enormous, and that, under the conditions described in Dr. Bulstrode's report, there must be much mischief done which is almost entirely preventable.

In the present state of this question it has seemed to me to be of some value to gather what information one could about the consumption of raw shellfish by persons attacked with enteric fever. Unfortunately it is only exceptionally that the information so obtained is precise and complete. What is quite certain, moreover, is that immense quantities of raw shellfish are consumed in Manchester without any bad consequences ensuing. As Sir Richard Thorne Thorne has pointed out, that is not to be taken as negativing the view that attacks of fever may be due to the consumption of raw shellfish. There must be a somewhat rare conjunction of circumstances to bring about such a causal connection. On the other hand, the consumption of raw shellfish antecedent to an attack of fever might well be a not infrequent event without any inference of causation necessarily resulting.

This being premised, the ascertained concurrences in 1896 are as follows :—

Shellfish Eaten Raw	Period before Illness	If Partaken of by other Members of the Family	No. of Case	Remarks
Oysters and mussels ...	3 weeks	?	23	
Oysters and mussels ...	14 days	?	26	
Mussels	21–27 days	?	98	
Mussels	3 weeks	?	165	
Mussels	1 week	?	180	
Mussels and Oysters...	7 days	?	182	
Mussels	17 days	?	198	
Oysters	13 days	No	232	Case at the same house seven months before
Oysters	33 days	No	233	
Oysters	10 days	No	237	
Oysters	14 days	?	241	Was living at Blackpool with two typhoid convalescents
Oysters	19 days	No	318	Bad taste at the time
Oysters	7 days	No	326	
Mussels	2½ weeks	No	344	
Mussels	7 days	?	425	
Oysters	1 week	?	429	
Whelks	14 days	No	434	Tasted bad
Mussels	14 days	?	444	Made him feel ill at the time
Mussels	About a fortnight	?	450	
Mussels, two quarts ...	A fortnight	?	459	

In the following cases raw shellfish were frequently partaken of antecedent to the attack :—47, 55, 70, 84, 91, 94, 104, 107, 113, 131, 141, 168, 175, 186, 202, 210, 215, 252, 349, 479, 501 to 505 all of the same family, 510, 520.

In the following instances raw shellfish were partaken of at a period before the commencement of illness not defined : 194 (who nursed a previous case), 364, 374, 386, 393, 394, 406, 423, 438, 474, 512.

There can be little doubt that this represents a proportion of people (over one-tenth of the cases) considerably larger than the proportion of the adult population who consume raw shellfish, and, of course, many of the other patients were not of an age to be consuming raw shellfish. So far as this information goes, then, it adds somewhat to the evidence pointing to a general danger from shellfish.

The instances have also been collected in which the patients had partaken of ice creams, but the information so obtained does not point to this as a cause of the disease.

I have partly prepared, and partly had prepared, an analysis of each case of enteric reported in 1896, showing the age, sex, district, occupation, infective history, milk supply, isolation, closet accommodation at home, insanitary conditions of the home, peculiarities of the water supply, some particulars of the food, and special circumstances of the patient, so far as then obtained.

We are, therefore, in a position to say how many cases show a history of infection. I do not say that we can tell *the proportion* of all the cases in which a history of infection can be made out, since, doubtless, in not a few of the cases notified the patient would prove not to have the disease. The cases are as follows, with the intervals :—

No.	Interval after the previous case began	Contracted elsewhere ?
1	34 days	Three weeks
4	29 days	Three weeks
8	After recovery, 30 days	...
9	Two recent cases, 51 days and 78 days	...
10	11 weeks (?).....	...
11	16 days	...
14	Series of slight illnesses	...
15	Almost simultaneous ; two previous cases in houses near	...
19	26 days	...
34	3 months	...
39	16 and 12 days	...
63	Four previous recent cases, 14 days (2), 26 days, and 30 days.....	...
71	4 weeks	...
83	Five previous cases ; see 63, 8 days	...
88	Four recent previous cases, 68 days, 69 days, 70 days, and 142 days.....	...
90	19 days	...
95, 96, 97	Previous case in Failsworth	...
109	Ascribed to baths	...
113	14 days ; wife had "pneumonia"	...
115	Previous case, unwell five weeks	...
123	Overlooked case, 7 days	...
124	6 days	...
127	Contracted in gaol	...

No.	Interval after the previous case began	Contracted elsewhere?
137	14 days	...
154	Two doors off two cases of "pneumonia"	...
155	14 days	...
157	Aunt had diarrhœa four months before; five doors off	...
159	Left home 35 days before her mother, having enteric	...
167	Just nursed sister with "diphtheria"	...
169	Two previous cases; last interval 12 days	...
172	28 days	...
173	30 days	...
181	Previous cases, 26 days and 91 days	...
185	A number of cases in neighbourhood	...
194	31 days	...
196	Nursed a case up to a week before	...
199	Mother removed to Hospital 15 days before	...
200	Previous case, same as 199	...
201	Previous cases, 173, &c. 34 days after 1st case	...
208	Has just nursed brother and sister with "pneumonia"	...
221	Previous cases, 200, &c. 18 days after last case	...
225	Case just removed from next door	...
232	Case 7 months before	...
239	Visited brother with "influenza" 11 days before	...
241	Contracted in Blackpool?	...
243	Previous case, 51 days	...
247	10 days	...
250	Previous case (at home), 103 days	...
267	Brother just recovered from "pneumonia"	...
269	Previous case (at home), 10 days	...
272	Previous case (at home), 28 days	...
279	15 days	...
335	Previous case (home), 41 days	...
350	Previous case (home) 25 days	...
353	Previous case (home), 10 days	...
356	From washing infected clothes (?)	...
362	Previous case, 10 days	...
367	Previous case, 353, &c. After 2nd case: 13 days	...
368	Previous case, 353, &c. After 2nd case: 17 days	...
369	Previous case, 353, &c. After 2nd case: 20 days	...

No.	Interval after the previous case began	Contracted elsewhere?
376	Previous case, 11 days	...
377	Previous case, 26 days	...
379, 380	34 days	...
385	12 days	...
399	Previous cases, 369, &c. After 5th case, 21 days	...
401	Previous cases, 380, &c. After 3rd case, 19 days	...
410	Previous case, 17 days	...
412, 413	Previous case, 13 days	...
452	Betrothed removed three weeks before	...
465	Sister now ill	...
484	4 weeks	...
494	Case just recovered	...
498	Return case (?)	...
502	8 days	...
503	9 days	...
504	12 days	...
505	14 days	...
517	Previous case (home), 27 days	...
518, 519	Previous case, 2 days	...

Thus in 85 out of 521 patients reported some source of infection is assigned, and, with the exception of seven cases, viz., 109, 127, 157, 185, 232, 239, and 241, the histories may be reasonably accepted as showing a previous source of the disease. This is a proportion of infective histories which completely does away with the idea that typhoid fever does not assume the ordinary infective mode of attack, as indeed must amply appear to anyone who takes the trouble to investigate the mode in which typhoid fever behaves in the household. Considerable trouble is taken in Manchester to remove the danger arising from infected excreta in cases which have been reported sufficiently early, and ample instruction is given in the precautions to be taken in the bedroom. Much of this effort is, however, rendered nugatory by the late period at which enteric fever is reported.

There can, nevertheless, be little doubt that the greater number of cases infected at home, in consequence of the previous occurrence of enteric fever, are so infected by channels other than the closets, although these do exercise a distinct effect. I have, in the Report for 1895, given figures which show that relatively to the pail-closets the middens exert a distinct influence in the later months of the year.

The same thing is apparent in 1896 in the months of September, October, and November, as may be seen by the following statement, which is to be taken along with those given in the Annual Report for 1895 :—

1896.—Statement of Pail-closets, Middens, &c., attached to Houses in which Enteric Fever has occurred.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Pails	33	22	21	24	33	23	19	20	22	35	22	30	304
Middens	4	6	6	8	6	9	1	5	7	12	9	3	76
W.C.'s	1	2	4	4	3	2	2	4	4	3	8	1	38
Pails and W.C.'s	1	1	1	1	...	...	1	...	2	2	...	1	10
Middens and W.C.'s..	...	...	...	...	1	...	...	...	...	...	1	...	2

It must, however, be remarked that this influence is only a relative one, and that in the earlier months of the year the pails relative to the middens are in a great preponderance. Let us see what this means.

If we regard the pails as being innocuous, we must infer that the middens in the earlier months of the year actually exert a retarding influence on the production of enteric fever. Such a conclusion would manifestly be absurd, and we must therefore come to the conclusion that both exert an effect in producing the disease, although, from causes which as yet are not ascertained, the pail-closets are relatively more active in the earlier months of the years, the middens in autumn.

It is possible that the effects produced arise in different ways, and that the ground about the middens forms a favourable soil for the growth of the typhoid bacillus in autumn. According to this supposition, the positive action of the pails would be constant. But the figures do not support this idea, and we are driven to the view that there may be either some changes in administration as regards the pail closets at different periods of the year, or that there are special factors in the soil holding for one class of closet which do not prevail in the other. The former is the more probable supposition. Supposing pails to be returned uncleansed to the same or to different houses, and that the extent to which this occurs is greater in the colder months, the facts would be partly accounted for. I have, however, no proof that such *differential* neglect does occur.

That the conditions are sufficiently adverse for both pails and middens may be seen from the following figures, which, however, need this explanation, that when the pail-closet is without a urine guide, or what comes to the

same thing when the guide is corroded, the ground about the pail is necessarily saturated with urine. There are also other causes which produce the same result.

With this preliminary, I give the figures.

PAIL-CLOSETS WITH A GUIDE.

Adjoining the House		Within Four Feet		Over Four Feet Away	
Ground dry	Ground wet	Ground dry	Ground wet	Ground dry	Ground wet
78	25	8	1	80	13
103		9		93	

Total..... 205

PAIL-CLOSETS WITHOUT A GUIDE.

Adjoining the House	Within Four Feet of the House	Over Four Feet Away
51	5	37

Total..... 93

MIDDEN CLOSETS.

Adjoining	Within Six Feet	Six Feet and Upwards Away
20	14	42

Total..... 76

Water-closets 50, of which, however, 12 are in conjunction with pails or middens.

PAIL-CLOSETS AT NO SPECIFIED DISTANCE.

With a guide.	With no guide.
6	2

It has been estimated that the total number of pails stands to the middens in the proportion of $3\frac{1}{2}$ to 1, so that, accepting the diagnosis, the pails in connection with enteric closets are in more than their due proportion when compared with middens for the year 1896.

It will be observed also that though the proportion of pails without guides is not so high as in 1895, it is still nearly one-third of the total number, which is very remarkable considering the enormous number of guides fixed in 1895, and the still greater number in 1896. In fact, the great effort made to deal with this general and gross defect has manifestly been, in the main, unsuccessful.

If, again, we add to the closets with no urine guides those in which the ground was found wet, or sunk and wet, we get a total of 133 instances out of 307, or between one-half and one-third of all the closets, in an insanitary state.

It is not necessary to insist on the grossly insanitary nature of the pervious middens, especially where they adjoin houses.

To return to the subject of infection at home, it will be noted that in five instances infection is supposed to have originated from cases of pneumonia. It is an important feature of enteric fever that it sometimes appears to start with pneumonia. Of course pneumonia is a well-known complication of the disease, but it is not to this that I allude. The disease may begin with and be for a time entirely cloaked by the initial inflammation of the lung. In one instance infection is mentioned in connection with diphtheria, and a diphtheritic condition of the throat is not by any means rare in the earlier stages of the disease.

With a view to ascertain any possible influence of milk in causing attacks, I have written opposite the consecutive cases the name of the milkman supplying the family, which in nearly every instance has been ascertained. A careful examination of the individual milk supplies enables me to say, with almost absolute confidence, that these cannot have had an appreciable effect in continuing the disease in 1896, so far, at any rate, as the sources of the milk supply are concerned.

As regards the water supply, the same observation applies which was made last year. Although the position of the pipes is not rarely noted to be an unfavourable one, no evidence exists which could inculpate the drinking water. As regards No. 8, it is noted that the water was turned off two weeks before the first case.

As regards 77, the water pipe had burst in the passage 14 days before the illness commenced.

In the case of 143, the water was turned off a week before the illness commenced.

Three weeks before the illness of 218 the water pipe had burst.

These are all the facts in any way directing special attention to the drinking water, and as, in each case, the cases were singular, they cannot well be ascribed to the conditions mentioned.

We have seen that there are good reasons for believing that the conditions under which excreta are stored have to do with the occurrence of enteric fever, and that the evidence pointing in this direction is strong and, perhaps, conclusive, although of a peculiar order, and such as is not usually employed in inquiries of this description. There is, however, a good reason why we require to scan the returns for several years, and to rely rather on the trend of the figures than on those holding in any particular month. We have seen that this disease is not rarely conveyed by infection, and, with the few numbers reported in any one month, one such occurrence in a family would suffice to reverse the proper relation.

Further, a very large number of persons have used not only the closet at home, but also the closet at the place where their work is carried on. Clearly the danger is liable, with a pail or midden system at the place of work, to be even greater than it is at home, and we depend, therefore, on the proportion of persons who only use the closet at the home to bring out the relationship which I have mentioned. In order to estimate the degree of disturbance thus introduced, I have placed opposite each case in my list the occupation which he or she pursues, with a reference to the place of work, which is to be found in the Inspector's inquiry form.

We thus find that only 124 were stated to be altogether at home out of the 521 reported. It is, however, probable that a portion of the remainder pursued their avocations at home. It is clear, at the same time, that a considerable element of disturbance is introduced by the factor of occupation, which includes attendance at school, and that we could not thus expect that an enumeration of the closets would do more than provide evidence of a somewhat blunted character. It is on the continuance of the facts from year to year that we rely.

If, now, we study the occupations themselves, we find that from one or two works there are a succession of cases, but that this is not a very striking phenomenon. It will be sufficient, probably, to study the schools in this connection.

We find that only one case came from	24	schools	...	24
two cases from	13	,,	...	26
three cases from	5	,,	...	15
four cases from	5	,,	...	20
five cases from	1	,,	...	5
				90

In estimating how far the closets at the schools could have been instrumental in the propagation of the disease we must apply several tests. In the first place the cases must not have been separated by an interval of more than two months in time. In the second place there are separate closets provided for the boys and girls. Hence if the sex of the consecutive cases

differs, the link of causation is necessarily thereby broken. In the third place there must be an absence of any clear history of infection from any other source. Applying these tests we find that the cases sink to—

2 consecutive cases.....	2	instances.
3 consecutive cases.....	2	instances
4 consecutive cases.....	1	instance.
5 consecutive cases.....	1	instance.
19 cases.	6	instances.

There is, thus, some indication of the transmission of the disease at school, though this does not amount to proof, and the same may be said of some other occupations.

Supposing the disease to exist at school in a latent form, and to be transmissible by the closet, the conditions would often be favourable, since the fæces are allowed to accumulate in the latrines, and are then carried off by a big flush, which may either be automatic or regular, or started by hand and irregular. It is a singular fact that six consecutive cases of children attending different schools were reported about three weeks after the Whitsuntide holiday.

So far as this analysis goes, it supports, though feebly, the view that the closets exercise an influence in transmitting the disease, while it gives a kind of measure of the amount of disturbance introduced into this question by "occupation."

In a report of this character there is scarce room for the investigation of individual cases to any great extent. At the same time, I propose to give a few instances of inquiry into cases which illustrate particular points. The following case, investigated by Dr. Tonkin, illustrates conditions of the pail-closets, which must be supposed to lead to the propagation of disease. The statement that pails were emptied out and not replaced by clean ones is one which requires noting.

The other conditions are not uncommon in connection with pails adjoining houses. This is one of the rare instances in which the water supply might be suspected.

The patient, f. æt. 14, was the fourth case in the family, previous cases having occurred, the onset of illness of which was stated to be on October 12th, 1895; November 8th, 1895; and December 18th, 1895. The onset of the present case was stated to be on December 29th, 1895. The following is Dr. Tonkin's statement:—

"A. B., f. æt. 14, No. 9.

"The father of this patient has had enteric fever, illness beginning about "15 weeks ago.

"The patient drinks milk, which is always first boiled. No oysters or "mussels have been taken.

"The convenience here is a 'pail-closet.' It is 4ft. by 8ft. by 8ft. in size. "The floor is flagged, the floor and walls are damp, and ventilation is by the "door only. There is a good urine guide attached, but the opening through "the closet seat is so far forward that this guide is situated over the front "wall on which the seat rests. On account of this position of the guide, "urine flows on to the floor and not into the pail. Again, on account of "the opening in the closet seat being so far forward, the pail is not placed "exactly under it, and *occasionally* solid fæcal matter may drop to the floor. "I asked Mrs. B. if this happened, and she said that it did, and that about "three or four months ago she had drawn out the pail and cleaned a lot of "this matter out, which she threw into the dustbin. The floor is simply "swimming in fluid matter, and the whole closet smells badly. This privy is "built against the kitchen wall; the fireplace is on one side of this wall and the "pail on the other, so that at this point there would be warmth and dampness. "The father was ill for nearly a fortnight before his case was pronounced as "one of enteric fever, and during that period he made use of the privy. If "any fæcal matter then containing typhoid bacilli fell to the floor of the privy "and got washed toward the kitchen wall the conditions then would be very "favourable for their growth.

"Mrs. B., complained that at times the pails are not taken away and "replaced by clean ones, but are partially emptied on the spot.

"There is a strip of carpet down on the privy floor. This may have "become contaminated with typhoid matter, which would be distributed by "the atmosphere on the carpet being shaken.

"The house is slightly damp from below. It is clean, and in good repair.

"The cellars are only used for washing and the storage of coals.

"The water pipe crosses the kitchen floor from the front of the house, and "then up the wall separating the kitchen from the privy, but at a point about "three and a half feet from the situation of the pail. The water was turned "off from this block of houses about four months ago; that would be about "a week or two before the father was taken ill. The pipes would then be "empty, and a leakage may have occurred into the pipes somewhere in their "course; this possibly may have been the origin of the first attack in this "house."

The *second case*, f. æt. 21, illustrates how typhoid fever is spread in a household, and probably in the sick room. Notified January 14th, 1896.

The following previous cases occurred in the same household :—

F. æt. 9, notified Nov. 21st, 1895.

M. æt. 7, notified Dec. 18th, 1895.

The following is Dr. Tonkin's statement :—

"P. Q., f. æt. 21. Jan. 20th, 1896. Prog. No. 19, 1896.

"There have been three cases here. M., f. æt. 9, had been ailing for "3 or 4 weeks before her case was notified. The first week or two of this "period was spent at another house, where this family formerly lived. M. had "been nursed at home. A., m. æt. 7, used to be constantly playing about the "sick room, and got into bed with the patient on a few occasions. P. Q. "nursed the first patient, and used to sleep in the same bed with her.

"There is no yard space. There is a W.C. (wash down) on the ground "floor opening into the scullery. This is ventilated to the street by two "ventilators, each 6in. by 6in. in size. The soil pipe is not ventilated."

Case 3.—Illustrates the manner in which typhoid fever may be propagated by pail-closets and midden privies under unfavourable circumstances.

The patient was a boy, æt. 6, whose illness commenced about January 3rd, 1897, but was not notified until January 17th, 1897.

During this period he would, no doubt, use the closet, described as follows, which he might easily soil. When the child was unable to use the closet, his excreta would be deposited in it.

It may be observed that the other conditions of the house were such as of themselves to make it uninhabitable.

"This is a three-roomed house and scullery combined. It is a through "house, but there is no yard space, the back door opens into an entry which "is about four feet wide. At the head of this entry two pail-closets are "situated; in the one used by the occupants of the above house the urine "guide is corroded, and the whole place is in a very filthy condition. There "is no lock to the door, so that it may be used by any person who may care "to do so, though it is supposed to be used only by the occupants of three "houses. This privy is built against the scullery wall of No. 6, and partly "covers in the scullery window of that house."

Case 4.—Illustrates what may happen at some of our seaside "health" resorts, inevitably, so far as one sees, unless for their mutual protection visitors would submit to an inquiry into their previous history as regards illness. I have formerly called attention to the crop of cases of typhoid fever which is apt to spring up some three weeks after a summer holiday.

M. N., f. æt. 28, returned from a seaside resort on May 31st. Illness commenced definitely about June 14th. At the house where this patient was lodging were two people, with whom she consorted for three days, who stated that they were convalescing from an attack of enteric fever.

This patient also had raw oysters while living at the seaside.

Case 5.—As another instance of household infection I give the following:—

J. R., m. æt. 3, died January 4th, 1896, from "Enteritis." His illness commenced about December 21st, 1895.

A. R., f. æt. 7, reported January 11th, 1896. Illness began January 8th.

W. R., m. æt. 11, reported January 24th, 1896. Illness began January 20th.

C. R., f. æt. 6, reported January 24th, 1896. Illness began January 20th.

E. R., f. æt. 1, reported February 10th, 1896. Illness began February 3rd.

I requested Dr. Tonkin to inquire into the circumstances of this household, and he reported as follows :—

"E. R., f. æt. 1. Prog. No. 63, 1896 (visited March 5th).

"I could not trace the incidence of infection here, but the following "possible sources occurred. All the children who were attacked by enteric "fever slept at times in the same bed as the child John, who died of 'enteritis.' "During the first week of his illness John, on one occasion, passed fæces on "the hearthrug. This was simply wiped up. If this rug were subsequently "shaken, this would be a probable source of infection. This rug was thrown "on the ashpit a week later. Linen soiled by John were placed in a 'mug' full "of water, clothes belonging to the other children were also placed in this "'mug,' though not at the same time and not in the same water. The soiled "linen was washed in the yard, and the water thrown down the drain. Water "lodges in several places in this yard. The clothes were dried in the street "or in the kitchen. All clothes are said to have been boiled. Fæces were "thrown into the pail-closet after the first week of illness. All stools were "treated with liquid carbolic acid. A new urine guide has been attached to "the pail-closet. The floor is damp."

Case 6.—M. æt. 52, presents no special feature as regards the etiology of the disease, but allows me to give an illustration of the insanitary conditions which may be found in a modern dwelling. The report is by Inspector Elliott.

"Prog. No. 65, 1896.

"Charles Wood, m. æt. 52, living at ——— (visited March 27th, 1896)."

Inspector Elliott reports having visited the above address *re* this case, and found the following, in addition to the previous reports :—

"The patient (now deceased) was employed in the warerooms of Messrs.

"Urine passes between the pan closet and the seat, and has saturated the "riser of the seat, and also appears to have run down on to the kitchen "ceiling below.

"The bath and slopstone pipes are not trapped.

"The supply cistern (which also supplies the W.C.) is in a dirty condition, "and is situated under a bedroom floor; the joints of the boards covering it "are quite open, and when the room is swept a large quantity of the dust is "precipitated into the water. This also causes dampness in the room.

"There are two surface sinks in the yard, which are of the deep gully type "and are in a foul condition.

"The soilpipe is composed of light cast-iron pipes such as are used for "rain-water, with putty joints, and seamed lead pipe connections. This soil-"pipe is defective.

"The yard has no suitable surface covering, and is in a bad condition. "This allows water to freely pass to the cellar walls and floors, which are very "damp. The Inspector noticed that the damp cellar walls had a fungoid "growth upon them, and suggests that the walls be lime-washed and the cellar "floors concreted.

"The drains in the cellars are bad; when a lighted taper was placed where "the Lowe's trap joins the flag it was blown out. The whole of the drains "require examination."

Notices to remedy these defects will be served, and an examination of the other houses in the block will be made.

Case 7.—The patient, m. æt 25, was an organ grinder, while the occupier of the house was a master organ grinder and ice-cream vendor.

The case was notified on February 19th, 1896, and is stated to have begun on February 10th, 1896.

The ice-cream is made in the backyard, in close proximity to the pail-closets, the yard being common to three houses.

A second instance of the same risk to ice-cream is given shortly after.

These cases all occur amongst the first hundred reported in 1896, and it will be evident that one receives a very decided impression about the manner in which typhoid fever is propagated in a household, while numerous hints occur of the way in which the disease may be propagated. It is, I think, well worth while to make it clear that we cannot afford to trifle with isolation in typhoid fever any more than in scarlet fever.

The following tables exhibit—

1. The relative incidence of the disease on the different districts of the City, and the proportion of cases removed to the hospital. The average proportion isolated during the years 1894–96 has been 50·3, as compared with 48·5 per cent. in 1891–93.

2. The numbers reported week by week. The figures for a number of years were exhibited in a chart in the Report for 1895 in juxtaposition with those for scarlet fever and diarrhœa. In regard to all three diseases it is probable that the seasonal changes in the curves indicate varying growth of the bacteria of the respective diseases in and out of the soil under seasonal influences. The curves of these diseases have remarkably constant relations to each other.

3. The remaining tables show that, though good relatively to many previous years, the position of Manchester is not so favourable relative to England generally as it was in 1895.

ENTERIC FEVER ATTACKS, 1896.

DISTRICTS OF MANCHESTER	ATTACKS	ATTACK RATE PER 1,000 LIVING	† CASE FATALITY, PER CENT.	REMOVALS TO HOSPITAL, PER CENT.
Ancoats	40	0·86	32·5	65·0
Central	40	1·08	40·0	65·0
St. George's	50	0·77	24·0	56·0
Cheetham	24	0·77	20·8	37·5
Crumpsall	4	0·43	75·0	50·0
Blackley	5	0·62	...	60·0
Harpurhey	18	1·57	16·7	33·3
Moston	10	1·55	40·0	40·0
Newton Heath	34	0·91	14·7	64·7
Bradford	27	1·18	25·9	70·3
Beswick	27	2·51	7·4	55·5
Clayton	7	1·73	...	28·6
Ardwick	29	0·77	24·1	65·5
Openshaw	33	1·09	21·2	36·3
Gorton (West)	17	0·61	35·3	41·2
Rusholme and Kirk...	14	0·72	21·4	42·8
Chorlton-on-Medlock..	53	0·85	26·4	43·4
Hulme	81	1·11	21·0	49·4
City of Manchester.	**513**	**0·95**	**24·2**	**52·4**

† Corrected; the fatal cases are those occurring amongst the cases actually notified.

ENTERIC FEVER ATTACKS IN WEEKS ACCORDING TO DATE OF ONSET. 1896.

FIRST QUARTER		SECOND QUARTER		THIRD QUARTER		FOURTH QUARTER	
Jan. 4	11	April 4	8	July 4	5	Oct. 3	11
,, 11	8	,, 11	13	,, 11	10	,, 10	18
,, 18	9	,, 18	17	,, 18	7	,, 17	18
,, 25	17	,, 25	10	,, 25	5	,, 24	17
Feb. 1	10	May 2	18	Aug. 1	7	,, 31	13
,, 8	9	,, 9	7	,, 8	8	Nov. 7	10
,, 15	8	,, 16	10	,, 15	8	,, 14	6
,, 22	9	,, 23	10	,, 22	11	,, 21	9
,, 29	8	,, 30	4	,, 29	6	,, 28	10
Mch. 7	12	June 6	9	Sept. 5	14	Dec. 5	15
,, 14	9	,, 13	9	,, 12	12	,, 12	6
,, 21	6	,, 20	11	,, 19	4	,, 19	8
,, 28	2	,, 27	4	,, 26	11	,, 26	9
						Jan. 2	7
Total...	118	Total...	130	Total...	108	Total...	157

City Total 513

1896.—Enteric Fever Sickness.—Rate per 1,000 living.

	1891	1892	1893	1894	1895	Mean	1896
Twelve Notification Towns...	1·09	0·90	1·85	1·32	1·45	**1·32**	1·38
City of Manchester	1·50	1·19	1·19	0·88	0·94	**1·14**	0·95
Manchester Township.....	1·37	1·18	0·93	1·04	0·70	**1·04**	0·88
North Manchester	1·36	0·94	1·08	0·73	0·98	**1·02**	1·11
South Manchester	1·65	1·33	1·42	0·86	1·06	**1·26**	0·91

Enteric Fever, 1896.

Ages	Attacks	Deaths	Case Fatality, per cent.
Under one year.....	2	1	50·0
1 to 2 years	6	2	33·3
2 to 3 „	3	...	...
3 to 4 „	9	5	55·5
4 to 5 „	12	1	8·3
5 to 6 „	15	3	20·0
6 to 7 „	12	1	8·3
7 to 8 „	10	...	...
8 to 9 „	18	1	5·6
9 to 10 „	15	1	6·7
10 to 15 „	72	5	6·9
15 to 20 „	77	21	27·3
20 to 25 „	88	20	22·7
25 to 30 „	93	31	33·3
35 to 45 „	48	17	35·4
Over 45 „	33	15	45·4
All ages.....	513	124	24·2

Percentage of Deaths in Cases of Enteric Fever at Different Ages, 1891–92–93–94–95–96.

Ages	Attacks	Deaths	Case Fatality
Under one year.....	6	4	66·6
1 to 2 years	21	6	28·6
2 to 3 „	41	7	17·1
3 to 4 „	59	15	25·4
4 to 5 „	98	11	11·2
5 to 6 „	104	14	13·5
6 to 7 „	97	11	11·3
7 to 8 „	96	12	12·5
8 to 9 „	104	6	5·8
9 to 10 „	97	10	10·3
10 to 15 „	560	68	12·1
15 to 20 „	609	125	20·5
20 to 25 „	509	100	19·6
25 to 35 „	566	163	28·8
35 to 45 „	293	107	36·5
Over 45 „	195	78	40·0
All ages	3,455	737	21·3

1896.—Mortality from Enteric Fever.—Rate per 1,000 living.

	1891	1892	1893	1894	1895	Mean	1896
England and Wales	0·17	0·14	0·23	0·16	0·17	**0·17**	0·17
London.....	0·13	0·10	0·16	0·15	0·14	**0·14**	0·13
Dublin	0·53	0·38	0·80	0·42	0·29	**0·48**	0·45
City of Manchester	0·37	0·24	0·25	0·17	0·18	**0·24**	0·22
Manchester Township	0·40	0·24	0·18	0·23	0·18	**0·25**	0·28
North Manchester	0·29	0·25	0·27	0·14	0·16	**0·22**	0·18
South Manchester	0·40	0·24	0·27	0·16	0·19	**0·25**	0·20

ON MEASLES AND WHOOPING COUGH.

During the year 1896 the number of deaths recorded as from measles was 567, from whooping cough 359. Over the same period the number of deaths from scarlet fever was 198, from enteric fever 118, from diphtheria and membranous croup together 83.

Thus measles was by far the most fatal of the infectious diseases with which we endeavour to deal, while whooping cough was much more fatal than scarlet fever or enteric fever.

Unquestionably the higher death-rate from the first two diseases is, to a great extent, due to the smaller measure of control which the Sanitary Authority exercises over the first two diseases.

No one disputes the desirability of dealing with these diseases in an efficient manner, and various proposals have been put forward for bringing them within the operations of the Sanitary Authority. These proposals have been collected and criticised by Dr. Theodore Thomson, one of the inspectors of the Local Government Board. Dr. Thomson, while admitting the failure of notification to control the spread of measles, maintains that this arises largely from an insufficient use of the information so obtained, which he thinks should be employed to trace the cases not so brought directly to the notice of the authority. His contention, however, only emphasises the real difficulty, which is caused by the fact that measles is a rapidly spreading disease, the number of cases increasing so rapidly as to throw a great and intermittent strain on the Health Authorities. Generally speaking, sanitary inspectors have plenty to do, and if called upon to deal effectively with an outbreak of measles would be compelled to put aside their ordinary work, and betake themselves entirely to the investigations and efforts required to cope with the disease. This would imply a considerable and not infrequent dislocation of their ordinary work, than which nothing could be more fatal to its efficiency, built up, perhaps, by painful labour and care. Moreover, the results are uncertain, especially as sanitary authorities can scarcely be expected to provide adequate hospital accommodation for outbreaks of a duration so limited as those of measles usually are.

Realising this difficulty. Dr. Thomson suggests that a temporary addition might be made to the sanitary staff. It has, indeed, been further suggested that a floating body of inspectors should be organised, whose services might be available for Sanitary Authorities temporarily in need of them. There is something to be said on behalf of this proposal, provided always it be well understood that the ordinary work of the Sanitary Inspector is not too much encroached upon.

Not to mention minor suggestions of value, the chief alternative or supplementary course is to rely on the schools for timely intimation of the occurrence of cases of measles. In a large town this will be taken along with the intimation of deaths from measles made by the Registrars, which enables us, though tardily, to know something of what is going on in the schools.

As I understand, arrangements have been made in Manchester by which irregular attendances are, in nearly every instance, reported to the School Board as well from Voluntary as from Board Schools. The causes of the irregularity of attendance are often known to the teachers, and are readily ascertained, when known, by the school attendance officers, who hand in an official list once a week on Saturdays.

It is manifest that by a little extension of existing arrangements it should be possible for the School Board to obtain cognizance in nearly all the schools as soon as infectious disease has appeared in a school, and so, at once, to apprise the Health Office.* As it is, we are indebted to the School Board for information as soon as they become aware of the serious incidence of infectious disease in a school. Unfortunately, that is often somewhat late.

The use which we make of the information received is to obtain from the head-teacher a list of the scholars or relatives of the scholars attacked, with their addresses. The Sanitary Inspector then pays a visit to each house invaded and gives instruction as to isolation and disinfection.

At the same time the teachers are requested to examine all their scholars once a day, and to send home those which present any symptoms of the onset of a catarrhal or other acute illness.

Should the number of scholars attacked by measles reach or exceed ten per cent., the school is closed for three weeks; or if the infant department alone is much affected, this department alone is closed.

This is a policy which has been criticised, sometimes unfavourably.

In Dr. Thomson's report, he makes a distinction between urban and rural communities. He shows clearly the advantage to be derived from closing

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* Arrangements have just been made by which such information will be supplied to the Health Office.

schools in a rural community, and shows that by this step it would appear that the disease is arrested.

Nor is the reason far to seek, whether we have regard to his experience or to that with which we are ourselves familiar. We find that if children are packed together in dense classes, as they generally are, the disease passes quickly from one to the other. It is quite a frequent occurrence to find that measles has severely attacked one school, while another in the same district is comparatively free. It is difficult to believe that this is due to anything else than to the rapid propagation of measles in the school. It is true that children at the same school are more together out of school hours than are children belonging to different schools, but not to an extent to prevent the spread of the disease to other children were it chiefly or even largely spread outside.

That this is Dr. Thomson's opinion, as it is that of others, is shown by his statement that the disease might be arrested by the closure of all the schools in an urban district, and the inquiries of Dr. Shirley Murphy show that such indeed is the case when schools are naturally closed for holidays; but surely, if this is so, then the closure of any one school must be instrumental in stopping or diminishing the spread of the disease, not merely in the school, but in the neighbourhood, on one condition, viz., that the children who have attended the school which has been closed do not go to another school. This we endeavour to prevent by sending round to neighbouring schools, and requesting them not to admit scholars from the school which has been closed.

If, indeed, it could be shown that the closure of a school led to the spread of the disease in other ways not previously existing, or in extraneous quarters to an extent not previously prevailing, then it would be necessary to reflect carefully before taking this step. I cannot, however, see that such can be the case with the precautions which we adopt.

There is, also, this to consider. Measles having broken out in a school, which of us would like to have a child exposed to the certain risk of remaining in the infected class room. It is true that many parents are not so careful, but many are; and if some such step is not taken as the closing of the school, there is the risk that parents will remove their children from the infected school, and perhaps send them to another, into which they will be liable to convey the infection.

We are bound, I think, to take the only means of protection in our power against the immediate and imminent risk, and to safeguard other children as best we may against the contingent danger.

At the same time that a closing instruction is sent to the School Board or to the managers of voluntary schools, a request is addressed to the superintendent of the Sunday school or schools in intimate relation with the school to be closed, requesting them to close their Sunday schools for three successive Sundays. This request has been most courteously acceded to.

It will be seen that a distinction is drawn between the infant and other departments of schools. The reason for this is the same as that which has already been given for closing schools altogether. It is desired to interfere with education as little as possible, while we know that the disease invariably spreads most rapidly among the youngest children, and is most fatal to them when it does attack them. Hence, if we do nothing else by separating these children, we shall be removing a rapid process of infection, where it is most energetic and most dangerous to life. There is, I think, no doubt whatever that such is the result, as far as the particular department or particular school is concerned, and, as I have said, we take a precaution which ought to be amply sufficient to prevent the children being received elsewhere.

I do not propose on this occasion to consider the whole question of improved administration in regard to this fatal disease, but only the closing of schools. As we saw last year, there was some reason for believing that the closing of schools, though it had not been successful in stopping the outbreak, had the effect of diminishing its intensity, if, also, it was extended in time. I have caused an inquiry to be made into the attendance on schools recently closed, after the closing period has elapsed. This has been done with the object of ascertaining partly the change in the incidence of disease sequent on closing, and partly what truth there might be in statements made that pupils had been lost to the school by closing it, and that, consequently, whatever good the proceeding might otherwise do, it was not to the interest of the school closed.

Fortunately or unfortunately, a number of the inspectors and teachers have taken my request for a statement of the impression of the teachers as to the facts as being a request for their opinion on the question of closing schools, which would appear to be a somewhat controversial one.

I do not regret the misunderstanding, as it gives me an opportunity of perceiving the views and feelings with which the closing of schools is regarded by teachers.

These are set out in the following statement, along with such facts as I have obtained. Where three successive numbers are given, they relate to the first three weeks after the reopening of the school.

Remarks	School	Statement of Views by the Teachers	Facts Ascertained	
			Average Attendance before Closing	Average Attendance after Reopening
Readjustment of classes, &c., was going on here, and the figures do not relate to the same children.	No. 1	Closing schools does no good, and the incidence of measles is not thereby affected.	75 °/₀ of 379	66 °/₀ of 247 first week after reopening.
	No. 2 (Infant Department)	Closing schools does no good. Before a neighbouring school was closed there were *only three cases* in this school. Since that school was closed *all the cases will have been the result* of infected children running about the streets.	167	207
	No. 3	The children appear healthier generally since the school was reopened.	173	290
	No. 4	Closing has done good here, if only for disinfecting the school. Is not in favour of closing, as the children are always in contact with one another.	178	254

Remarks	School	Statement of Views by the Teachers	Facts Ascertained	
			Average Attendance before Closing	Average Attendance after Reopening
	No. 5	Closing the schools, in this lady's opinion, spreads the measles, as she found the epidemic spread rapidly when the neighbouring schools were closed.	131	146
	No. 6 (Infants)	Would close all infant schools, but not merely one.	147	185
	No. 7	....	181	158 Whooping cough 13 cases and measles 17 cases on reopening.
Closed on account of whooping cough.	No. 8	....	71	Weekly averages 115 130
Closed on account of whooping cough.	No. 9	....	Whole school 206 Infants 58	Whole school 202 207 200 Infants 53 87 84

Remarks	School	Statement of Views by the Teachers	Facts Ascertained	
			Average Attendance before Closing	Average Attendance after Reopening
	No. 10	Improvement has taken place in the occurrence of measles.	70	104
	No. 11	The facts which this lady gives induce her to conclude that "the epidemic is now almost at an end."	Week before closing, 99. When the school was closed there were about 35 children with measles, 4 on account of measles.	On reopening, 134. No fresh cases have been reported for the first week after reopening.
	No. 12	The closing of the schools has had a very bad effect on the attendance all round. In 1896, when the school was reopened, the attendance was worse, and took a considerable time to recover. The teachers doubt the *bonâ fide* character of the cases.	132	Weekly averages 159 Whit-week 167

Remarks	School	Statement of Views by the Teachers	Facts Ascertained	
			Average Attendance before Closing	Average Attendance after Reopening
	No. 13	The attendance is generally bad after the schools have been closed.	Infants 164 Boys 171 Girls 160	Weekly averages Infants 147 Boys 148 Girls 143 Whit-week 197 169 163 So bad on the Monday that on Wednesday the school was closed for the rest of the week. Measles had become almost extinct.
	No. 14	The teachers give it as their opinion that the disease is spread outside as much as inside the school.	234	287. Measles much less. Attendance same as before measles began.
	No. 15	....	104	114 on day of reopening, June 14th. Attendance on June 18th, 140.
	No. 16	Fewer cases have occurred since reopening. The Head Mistress believes this to be due to the disease dying out.	128	157

Remarks	School	Statement of Views by the Teachers	Facts Ascertained	
			Average Attendance before Closing	Average Attendance before Reopening
	No. 17	Closing and disinfection appear to have been beneficial.	159	First week after reopening, 190. A month after, 212.
	No. 18	Closing of the school has been very beneficial.	254	Attendance somewhat under the average the first week. Since then has been up to the average. Weekly averages 247 278 285
	No. 19	The teacher is of opinion that the same result would have come about without closing.	151	Attendance has steadily increased since reopening, and is now at the average. There are no cases of measles now. Weekly averages 183 201 189

It will be seen that there is a considerable diversity of opinion on the subject of the benefit accruing from closing, and that there is no danger of an unduly favourable construction being put on the figures.

So far we have not had any resuscitation of the disease reported, though last year that happened in two or three instances, proving that the improvement had not been due to the "dying out of the disease," and that in reality the school had been the cause of the outbreak. No doubt, however, in some instances, where the cases had been allowed to increase to a very high proportion of the attendance, this explanation would be a correct one.

I shall make no further comment on these observations, except only to remark that the numbers appear to show either that the closing of the schools was singularly well timed to aid the natural process of decadence of the outbreak, as well as to furnish a good opportunity for cleansing and disinfecting the school, or else that in reality closing the school or the infant department was generally the means of greatly reducing the incidence of the disease on the particular school concerned.

Another matter deserves attention. It is probable that the catarrhal discharges ejected, both in measles and whooping cough, contain the infective material of the disease in abundance; and the same remark applies to diphtheria and scarlet fever. Such discharges are peculiarly liable to be intercepted by the books, &c., which children are using in the class-room, and which next day will come into the hands of some other child. It is, I think, plain that infectious disease must be spread in this manner, and indeed that this may be the chief means whereby disease is propagated in schools.

In my opinion, arrangements should be made in each large schoolroom to have a series of lockers with numbers attached, corresponding to similar numbers on the desk; or, if thought preferable, the name of the child could be attached to both. Thus, a definite place and a definite locker would belong to each child; which last he would be required to keep locked when not in use.

The locker would serve to receive the various articles, books, slates, &c., which the child required for use in school.

Supposing a child attacked with measles, his locker would be taken out and washed inside and out with solution of chloride of lime, 3oz. to the gallon The articles used by him would be treated in the same manner if it were possible to disinfect them. If not, they would be destroyed.

His place at the desk would be similarly disinfected.

The difficulty about clothes would not hereby be attacked. I do not think, however, that it is quite as important as the other. Clothes are not interchangeable, and, moreover, infection, except by means of the pocket handkerchief, will probably not get on clothes to the same extent as on books.

The overclothing of children is, at least in the cold season, generally collected in a small room, the clothes being squeezed together as a rule from want of room. This might be avoided in one or two ways, either by the provision of railings in the cloakroom, with hooks at suitable heights and intervals, the cloakroom being at the same time thoroughly ventilated.

Another plan is to provide separate compartments for the clothing of each child. The former plan is doubtless the best, cheapest, and most practicable in every way.

Each child should be educated to look closely after his own belongings, and not allow them to be used by other children.

So far we have not dealt so strictly with whooping cough as with measles, not from any idea of the lesser importance of that disease, but rather because it has been felt that the policy adopted in respect of measles, which has been itself restricted to the least interference which promised to be of use, should be carefully studied before extending it to whooping cough.

It has recently been stated in regard to whooping cough that it is exclusively in the earlier stages, when the symptoms are chiefly catarrhal, and before the whoop has appeared, that the disease is infectious. It is certain that both measles and whooping cough are most highly infectious at this stage, and there can therefore be no doubt that if the teachers were to concentrate their attention on the early recognition of infective catarrhs, and would promptly put their observations and proceedings at the service of the Sanitary Authority, it should be possible to do much in mitigation of the periodic outbreaks of these fatal diseases.

The methods which we have so far pursued and the forms used are given in the Annual Report for 1895.

Particulars relating to the incidence distribution of these diseases are given in the following figures, with regard to which it may be remarked that the tables again reveal, in respect of measles, what was pointed out last year, viz., that rapid as is the extension of the disease, it is not so rapid as to include the whole of Manchester in one prevalence.

This is readily seen on comparing the mortalities in the Manchester Township, in North Manchester, and in South Manchester for 1895 and 1896. While the mortality has much increased in 1896 in the first two divisions of the City, it has diminished in a manner equally decided in the last.

Nor is this an isolated occurrence. The same thing is observable on comparing any two other years, except 1894 and 1895. Thus, comparing the years 1892 and 1893 there is a decided drop in the mortality in the second year in the Manchester Township and in South Manchester, while in North Manchester the mortality has increased. The same thing is to be noted on comparing the deaths in different quarters in the respective divisions, as I have already pointed out.

We may reasonably infer from this that the most important determining causes of an outbreak of measles are not of a seasonal order, but are, rather, of the nature of opportunities. That is to say, the material available for the disease has again become abundant in a given district, or it has acquired, in certain schools especially, an increased potency, both in numbers and in vigour. It is to such causes that we must evidently look for the propagation of the disease. This impression is increased when we study the number of deaths in adjoining districts. Compare, for instance, Cheetham with the adjoining districts of Crumpsall and Blackley, or Bradford with the adjoining district of Beswick, or Chorlton and Hulme.

We cannot fail to perceive that there must be powerful local causes determining the fatality, and, therefore, if we take the same class of people, the propagation of the disease.

I do not think there can be much doubt that this local cause is the influence of particular schools, and that there is not a spread of the disease, outside, to compare with what occurs inside the school.

If, now, we study the mortality from whooping cough in this point of view, we perceive that matters are quite different. Thus from 1891 to 1892 the mortality from this cause diminishes in each of the three divisions of the City. It is the same from 1892 to 1893. From 1893 to 1894 there is an increase in each of the three divisions.

We are, thus, not in a position to say that seasonal influences do not powerfully affect whooping cough, though a careful study of the figures reveals here also the effects of local and limited causes.

It may be pointed out, however, that something like the same relative mortality holds from whooping cough and from measles in Chorlton-upon-Medlock and Hulme, so that in regard to these two districts we must assume provisionally that there may be other influences at work besides localisation of disease.

A relatively low mortality also occurs in the Central District of the Manchester Township as compared with Ancoats and St. George's. Here we know that the cause is the relatively small number of children in the Central District. This is, to some extent, the case also with Chorlton-on-Medlock. The lodger class in both instances is relatively large.

Nevertheless, allowing for these disturbing considerations, the phenomena of localisation are quite evident, at all events in the case of measles.

MEASLES.

The following are the rates of mortality for 1896:—

1896—MEASLES MORTALITY.—ANNUAL RATE PER 1,000 LIVING.

	1891	1892	1893	1894	1895	Mean	1896
England and Wales	0·44	0·46	0·37	0·39	0·37	**0·41**	0·56
33 Great Towns	0·52	0·69	0·44	0·63	0·53	**0·56**	0·71
London	0·43	0·80	0·38	0·76	0·60	**0·59**	0·82
City of Manchester...	0·43	0·72	0·57	0·42	0·96	**0·62**	1·05
Manchester Township ...	0·68	1·32	0·86	0·26	0·94	**0·81**	1·89
North Manchester	0·44	0·44	0·63	0·30	0·70	**0·50**	1·01
South Manchester	0·27	0·49	0·35	0·60	1·11	**0·56**	0·57
50 Smaller Towns	0·62	...	...	...	...	...	...
67 Smaller Towns	...	0·40	0·51	0·31	0·38	**0·40**	0·64
Rural Districts	0·33	0·30	0·27	0·24	0·26	**0·28**	0·43

The deaths from measles in districts are as follows :—

Statistical Areas		Estimated Population to middle of 1896	No. of Deaths
City of Manchester		**531,697**	**567**
I. Manchester Township ...		146,186	281
II. North Manchester.....		139,013	143
III. South Manchester.....		246,498	143
I.	Ancoats	45,991	97
	Central	36,584	30
	St. George's	63,611	154
II.	Cheetham	30,660	24
	Crumpsall	9,209	1
	Blackley.....	7,888	1
	Harpurhey	11,265	15
	Moston	6,338	1
	Newton Heath	36,602	29
	Bradford	22,461	60
	Beswick	10,602	8
	Clayton	3,988	4
III.	Ardwick	37,128	20
	Openshaw	29,686	23
	Gorton (West)	27,236	37
	Rusholme and Kirk.....	19,162	14
	Chorlton-upon-Medlock..	61,308	11
	Hulme	71,978	38

1896—Measles.—Deaths in Quarters in the City and in Groups of Districts.

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
City of Manchester	122	236	113	96
Manchester Township ...	54	150	57	20
North Manchester	14	43	33	53
South Manchester	54	43	23	23

WHOOPING COUGH.

The rates giving the whooping cough mortality for 1896 are as follows :—

WHOOPING COUGH MORTALITY.—ANNUAL RATE PER 1,000 LIVING.

	1891	1892	1893	1894	1895	Mean	1896
England and Wales	0·47	0·46	0·34	0·39	0·30	**0·39**	0·41
33 Great Towns	0·64	0·57	0·48	0·48	0·37	**0·51**	0·57
London	0·68	0·59	0·54	0·48	0·34	**0·53**	0·65
City of Manchester...	1·02	0·72	0·46	0·55	0·47	**0·64**	0·66
Manchester Township ...	1·24	0·86	0·64	0·55	0·72	**0·80**	0·92
North Manchester	0·72	0·60	0·28	0·45	0·37	**0·48**	0·50
South Manchester.....	1·04	0·69	0·45	0·60	0·38	**0·63**	0·60
50 Smaller Towns.....	0·39	...	...	...	...	...	...
67 Smaller Towns.....	...	0·49	0·31	0·39	0·32	**0·38**	0·43
Rural Districts	0·35	0·32	0·23	0·33	0·25	**0·30**	0·30

The following figures show that whooping cough was more prevalent in the first half of the year :—

1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
109	132	67	51

The deaths in districts are as follows :—

Statistical Areas	No. of Deaths
City of Manchester	**359**
I. Manchester Township	137
II. North Manchester	71
III. South Manchester	151
Ancoats.....	60
Central	30
St. George's	47
Cheetham.....	6
Crumpsall.....	4
Blackley	1
Harpurhey	7
Moston	1
Newton	27
Bradford	17
Beswick	5
Clayton.....	3
Ardwick	33
Openshaw.....	15
West Gorton.....	16
Rusholme.....	11
Chorlton-upon-Medlock	26
Hulme	50

In further elucidation of this subject, I append extracts from the memorandum of the Local Government Board, prepared in the Medical Department, on the circumstances under which the closing of Public Elementary Schools, or the exclusion therefrom of particular children, may be required in order to prevent the spread of disease :—

EXTRACTS FROM THE NEW EDUCATION CODE, 1897 (N.U.T. Edition, 1897).

"The diseases for the prevention of which school closure, or the exclusion "of particular children, will be required are principally those which spread by "infection directly from person to person, such as scarlet fever, measles, diph-"theria, whooping cough, smallpox, and rötheln, the order in which the "several diseases are here given being about that of the relative frequency "with which their occurrence gives rise to these questions at schools."

"The closing of schools is a measure that seldom ought to be enforced, "except in presence of an actual epidemic, nor even then as a matter of routine, "nor unless there be a clear prospect of preventing the propagation of disease, "such as could not be looked for from less comprehensive action."

"The attention of school attendance officers, and of schoolmasters, should "also be drawn to the following considerations:—Frequently they themselves "will obtain the earliest information of the occurrence of infectious disease "amongst scholars, and it is most desirable that such officer or master should "without delay communicate the facts to the Medical Officer of Health. "Absence of any child from school on the plea that it is suffering under one "of the before-mentioned diseases, and absence of several children of one "family from school at the same time, no matter what name may be given to "the complaint that keeps them at home, should be reported to the Health "Officer. In practice it has been found that this notification of absentees has "materially aided the Local Health Officer in taking measures for the "suppression of infectious disease, to the advantage alike of the district and of "the school."

"Commonly, the failure of carefully considered measures of exclusion "to stay the spread of an epidemic which shows a special incidence "upon school children may be regarded as pointing to the continued attend- "ance at school of children with the prevalent disease in a mild or "unrecognised form, and a strong case will appear for the closing of schools."

"If by reason of the absence or exclusion of a larger number of children "the attendance at a school be greatly reduced, it may be found better to "close it altogether. This is especially apt to occur in the case of an epidemic "of measles, a disease which is very infectious in the early stages, before the "characteristic rash has appeared, and while the symptoms resemble those "of a common cold."

"The second material consideration in deciding as to the desirability of "closing schools during the prevalence of infectious diseases is the amount "of opportunity for intercommunication between the members of different "households elsewhere than at school. In sparsely populated rural districts, "where the children of different households, or of separate hamlets, rarely "meet except at, or on their way to, the village school, the closing of the "school is likely to be effectual in checking the spread of disease. It is less "likely to be useful in a town or compact village (particularly where houses "are sublet and yards in common), where the children of different households, "when not at school, spend their time in playing together, and often run in "and out of each other's houses. In some such places the closing of schools "has even appeared to do harm rather than good. In rural districts where "epidemic diseases are less frequently prevalent, school closing may be "required as an exceptional measure to meet an exceptional state of things. "As regards more populous places, it must not be forgotten that if schools "were to be closed whenever an infectious disease was prevalent, there are "many places where schools would hardly ever be open."

This memorandum is signed GEORGE BUCHANAN, and dated December, 1890.*

I will now briefly annotate these extracts, which fairly represent the views of the Chief of the Medical Department of the Local Government Board.

We are in presence of an actual epidemic, as will be at once seen by reference to the weekly number of deaths from measles :—

DEATHS IN WEEKS— 1897.	MEASLES.	WHOOPING COUGH.
April 3rd	10	12
,, 10th	14	6
,, 17th	10	10
,, 24th	21	6
May 1st	19	13
,, 8th	15	12
,, 15th	17	10
,, 22nd	14	10
,, 29th	12	12
June 5th	14	14
,, 12th	19	9
,, 19th	15	6
,, 26th	25	14
July 3rd	24	5
,, 10th	19	3
,, 17th	31	6
	279	148

No carefully considered measures of prevention are possible, since the cases occurring at schools are not notified to the Health Office until they have reached such a number that closing is really the only effective course open to us. This is really the point for which we contend. If arrangements were made by which we could be informed of the names and addresses of the earlier cases occurring in schools we might hope to avert the necessity of closing schools, though this is by no means a certainty. It is precisely in regard to measles that the memorandum of the Local Government Board contemplates the possibility of closing being found necessary.

As regards the distinction between rural and urban schools, I have given reasons for believing that it is chiefly in the schools that measles is spread, and that in consequence, though we may not expect so much advantage from closing a school inside a town as one situated in the country, it is nevertheless decidedly in general a valuable preventive measure for measles.

In fact, I do not believe that the disease is communicated out of doors so readily as it is inside.

Clearly, if this is a correct view, it is applicable to that department of a school which is principally affected by an epidemic, just as it is to a whole school, and we have, therefore, in nearly every instance, consulted the interests of education by closing only the infant department of the schools.

The extent to which measles had become prevalent in schools before the Health Office became aware of its existence is shown in the following list, which gives the schools which have been closed during 1897.

* I have used the above as being the form which teachers have access to. But the Official Memorandum of the Local Government Board, dated July, 1897, price 1d., may be consulted with advantage.

MEASLES, 1897.

The first School notified re *prevalence of Measles was on April 5th, 1897.*

District	School	Disease	What extent	Closed	Remarks
St. George's ...	Abbott Street Board School	Measles	28 °/₀	Infant Department, April 12th to 30th	
Hulme	Duke Street Board School	Measles	13 °/₀	Infant Department,	
		Whooping cough	5 °/₀	May 11th to 28th	
Openshaw	Lees Street Board School	Measles	27 °/₀	Infant Department,	
		Whooping cough	4 °/₀	April 12th to 30th	
Central	St. Augustine's Roman Catholic	Measles	19 °/₀	Infant Department,	
		Whooping cough	9 °/₀	April 8th to 30th	
Central	St. Andrew's Church of England	Measles	18 °/₀	Infant Department, April 14th to 30th	
Hulme	St. Mary's Church of England	Measles	23 °/₀	Infant Department, April 7th to 26th	
Clayton	St. Cross' Church of England	Measles	25 °/₀	Whole School,	Rector saw Medical Officer of Health. Mixed department present—142 out of 225; so closed.
		Whooping cough	8 °/₀	April 12th to 30th	
Moston	Gill Street British.....	Whooping cough	.....	Whole School, April 8th to 23rd	Whooping cough. Councillor Ward saw Medical Officer of Health.
Ancoats	All Souls' Church of England	Measles	13 °/₀	Infant Department,	
		Whooping cough	4 °/₀	May 3rd to 21st	
Hulme	Bangor Street Board School	Measles	45 °/₀	Infant Department, May 3rd to 21st	
Hulme	Mulberry Street Board School	Measles	38 °/₀	Infant Department, May 3rd to 21st	
Chorlton-upon-Medlock	Grosvenor Square Board School	Measles	16 °/₀	Infant Department,	
		Whooping cough	5 °/₀	May 3rd to 21st	
Hulme	St. Mary's Church of England (Drayton Street)	Measles	24 °/₀	Infant Department, May 25th to June 11th	

MEASLES, 1897—*continued*

District	School	Disease	What extent	Closed	Remarks
Ancoats	St. Michael's Roman Catholic	Measles	Boys, 12 °/₀ Girls, 16 °/₀ Infants, 20 °/₀	Whole School, May 10th to 28th	
Blackley.....	St. Andrew's Church of England	Whooping cough	.....	Whole School, May 11th to June 8th	
Newton	All Saints' Church of England	Measles	About 15 °/₀	Infant Department, May 24th to June 11th	
Central	St. John's Church of England	Measles Whooping cough	45 °/₀ 12 °/₀	Infant Department, May 24th to June 11th	
Hulme	St. Michael's Board School	Measles	23 °/₀	Infant Department, May 24th to June 11th	
Central	St. Andrew's Church of England (Homer Street)	Measles	35 °/₀	Infant Department, May 24th to June 11th	
Central	St. Matthew's Board School	Measles	32 °/₀	Infant Department, June 18th to July 9th	
Chorlton-upon-Medlock	Christ Church Board School	Measles	20 °/₀	Infant Department, July 1st to 23rd	
Cheetham	St. Thomas's Board School	Measles	14 °/₀	Infant Department, July 1st to 23rd	
Newton	St. Ann's Church of England	Measles	Very bad	Infant Department, July 1st to 23rd	
Ancoats	St. Peter's Board School	Measles	25 °/₀	Infant Department, July 12th to 23rd	
Rusholme	St. John's Church of England	Measles	12 °/₀	Infant Department, July 19th to 23rd	
Newton	St. Paul's Board School	Measles	25 °/₀	Infant Department, July 19th to 23rd	

MEASLES, 1897—*continued*

District	School	Disease	What extent	Closed	Remarks
Ardwick.....	Armitage Street Board School	Measles	14 °/₀	Infant Department, July 19th to 23rd	
Chorlton-upon-Medlock	St. Paul's Church of England	Measles	25 °/₀	Infant Department, July 19th to 23rd	
Central	St. Mary's Roman Catholic	Measles	20 °/₀	Infant Department, July 15th to 23rd	
Chorlton-upon-Medlock	St. Saviour's Church of England	Measles	25 °/₀	Infant Department, July 15th to 23rd	
Gorton	St. Clement's Church of England	Measles	30 °/₀	Infant Department, July 19th to 23rd	

31 Schools Closed.

(27 Infant Departments; 4 Whole Schools.)

Board	13
Church of England.....	14
Roman Catholic	3
British	1
	31

22 Schools Reported, but not Closed.

Board.....	9
Church of England	6
Roman Catholic	4
British	1
Wesleyan	2
	22

Procedure after Closing.

(1) Wash through and afterwards fumigate.
(2) Report of Inspector on sanitary condition of school.
(3) Circulars sent to other schools in district.
(4) If Sunday school held on premises, suggest closing to the Rector or other authority.
(5) List of absentees handed to Inspector for special visitation.

Schools Reported, but not Closed

Gorton ...	... Thomas Street Board School...	... Whooping cough 7 °/₀—Infants
Ancoats...	... St. Ann's Roman Catholic Schools	5·2 measles; 5·2 whooping cough—Infants
Hulme ...	... St. Philip's Church of England	... 9·0 measles; 6·0 whooping cough—Infants

Rector gave holiday from April 15th to 23rd.

Hulme ...	... St. George's Church of England	... 19 cases of whooping cough out of 133
Chorlton-upon-Medlock	St. Chrysostom's Church of England	Medical Officer of Health visited
Ancoats...	... St. Barnabas' Board School ...	... Second return. 9 °/₀ measles; 15 °/₀ whooping cough. Medical Officer of Health would not close for whooping cough
Bradford	... Johnson Street Board School...	... Very few cases
Bradford	... Grange Street Board School ...	... Very few cases
Hulme ...	... Upper Jackson Street Board School	Very few cases
Hulme ...	... Vine Street Board School ...	... 35 °/₀ whooping cough
Chorlton-upon-Medlock	Webster Street Board School...	... 14 °/₀ measles

Not closed on careful consideration of the circumstances.

Hulme ...	... Lloyd Street Board School ...	... Very few cases
Newton...	... Oldham Road Board School ...	... 20 °/₀ measles

Medical Officer of Health sent letter to Mr. Wyatt, although bad, would not close at present. Children about returning.

Newton...	... Culcheth British School	... About 35 °/₀ measles, but epidemic practically over
Chorlton-upon-Medlock	St. Joseph's Roman Catholic Schools	10 °/₀ whooping cough
St. George's ...	Collyhurst Wesleyans	... Just under 10 °/₀ measles
Hulme ...	... St. Wilfrid's Roman Catholic	... Under 10 °/₀
Chorlton-upon-Medlock	Holy Family Roman Catholic	... 13 °/₀ whooping cough
Hulme ...	... St. George's Church of England (Ellesmere Street)	Very few cases
Rusholme	... St. Agnes' Church of England	... Very few cases
Moston...	... Lightbowne Church of England	... Very few cases—whooping cough
West Gorton...	Longsight Wesleyan	... Not 10 °/₀

ON SUMMER DIARRHŒA.

This is a fatal disease to which Manchester is exceptionally liable. The late Dr. Ballard showed that it had special affinity with fouling of the soil, and that the course of its fatality followed with considerable precision the indications of a thermometer placed in the soil at a depth of four feet. It has, however, connections with any kind of filth about a dwelling, and especially with those conditions which attend overcrowding.

The same investigator also made it plain that, in whatever manner the fouling of the ground might act, the means by which fatal diarrhœa was immediately conveyed to infants was food. This was very manifest from the slight extent to which the fatal disease occurs in breast-fed infants.

In a paper published in the Liverpool Medico-Chirurgical Transactions, Vol. VII., Dr. E. W. Hope, then Assistant Medical Officer to the City of Liverpool, discusses the subject very fully, and gives important figures in reference to it. Having personally investigated the history of 1,000 cases of diarrhœa, he found that only 30 were in children entirely breast-fed, as against 393 entirely hand-fed, and 287 partly breast-fed and partly hand-fed.

Accepting the estimates given to him by medical observers, that 50 per cent. of children under three months of age were entirely fed at the breast, and that 20 per cent. were so fed between the ages of three and six months, he arrives at these results :—

1. For every infant under three months of age fed entirely on the breast who dies of diarrhœa, 15 die out of the remaining 50 per cent. who receive other food in addition to or instead of breast milk.

2. Assuming that 15 per cent. of infants under three months are reared exclusively by artificial means, the deaths amongst infants so fed are twenty-two times as numerous as they are amongst equal numbers of partly or entirely breast-fed infants.

It is probable, I think, that the proportion of children entirely breast-fed was under-estimated, in which case the disproportion of incidence would be greater than he supposed it to be.

In 1896, I gave an account of an inquiry into deaths from summer diarrhœa, which showed that, as far as my figures went, the disproportion is so great that we may safely assume that the food of which an infant partakes is the factor which usually determines the fatal disease. Nor is this in any way put in doubt by the small proportion of breast-fed children who take diarrhœa, since, unless carefully watched, children stuff into their mouths all sorts of things.

We have thus two lines of defence against the disease—viz.: to keep our houses and milk arrangements clean; and, as far as is practicable, to have infants fed entirely at the breast.

The appended figures show that Manchester, as usual, takes a very unfavourable position in respect of this disease, mainly, I think, on account of the foul conditions of the soil.

In order to ascertain what intimacy of connection exists between diarrhœa and the condition of the closets, I have collected particulars of 536 deaths out of the 560 which were ascribed to diarrhœa in 1896. The remaining 24 papers were not filled up, or were spoiled by some oversight.

The particulars of closet accommodation are :—

Pail Adjoins			Pail within Four Feet			Pail over Four Feet		
Guide On	Guide Defective	Other Defects	Guide On	Guide Defective	Other Defects	Guide On	Guide Defective	Other Defects
135	42	24	9	7	6	126	31	21

Midden			Water-closet	Waste Water-closet
Adjoins	Within Six Feet	Six Feet and Over		
15	10	47	55	8

It will be seen, on comparing these with the corresponding figures in scarlet fever, that, if we can assume both sets of figures to have been obtained with equal rigour of inspection, there is not nearly that closeness of connection between fatal diarrhœa and bad closet conditions that there is between such conditions and the occurrence of scarlet fever. This was precisely what an examination of the returns showed in 1895.

A reference to the untraced cases of scarlet fever will make this point very clear; while a reference to the figures given under typhoid fever will show that the condition of the privies is as bad for that disease as for scarlet fever.

By means of these figures we are enabled to compare the fatality from diarrhœa in Manchester with that prevailing in other parts of the country.

1896.—Diarrhœa Mortality.—Annual Rate per 1,000 living.

	1891	1892	1893	1894	1895	Mean	1896
England and Wales	0·47	0·48	0·96	0·35	0·88	**0·63**	0·55
33 Great Towns	0·65	0·70	1·23	0·50	1·19	**0·85**	0·79
London	0·59	0·60	0·80	0·41	0·82	**0·64**	0·72
City of Manchester	0·81	0·79	1·75	0·70	1·66	**1·14**	1·04
Manchester Township	1·08	1·08	2·22	1·11	2·20	**1·54**	1·43
North Manchester	0·70	0·68	1·49	0·52	1·38	**0·95**	0·79
South Manchester	0·69	0·67	1·59	0·54	1·50	**1·00**	0·94
50 Smaller Towns	0·53	...	...	...	...	...	...
67 Smaller Towns	...	0·57	1·24	0·41	1·13	**0·84**	0·68
Rural Districts	0·32	0·32	0·72	0·24	0·64	**0·45**	0·36

The following table supplies meteorological data for the third quarter of the year, the season in which the disease is most prevalent :—

Third Quarter of the years	Mean Temperature	Rainfall	Humidity, per cent.	Diarrhœa Mortality. Annual Rate per 1,000 living
1883	58°·1	11·0	77 %	2·26
1884	61°·4	3·6	71 %	4·00
1885	56°·8	7·3	73 %	1·56
1886	59°·1	11·4	75 %	3·42
1887	59°·0	7·7	73 %	3·38
1888	56°·5	11·2	77 %	1·36
1889	57°·7	10·5	73 %	2·61
1890	58°·8	8·1	74 %	2·28
1891	58°·2	12·8	79 %	1·57
1892	57°·0	12·5	78 %	2·07
Mean	**58°·3**	**9·6**	**75 %**	**2·45**
1893	60°·4	10·7	74 %	4·95
1894	57°·8	9·0	78 %	1·55
1895	60°·4	11·2	77 %	4·17
1896	58°·5	9·7	76 %	2·86

The numbers of deaths in the diarrhœal season are as follows :—

Diarrhœa Deaths in Quarters 1891–1896.

	1891	1892	1893	1894	1895	1896
First Quarter	45	32	48	47	51	37
Second Quarter	64	36	131	55	59	78
Third Quarter	217	275	688	212	574	379
Fourth Quarter	106	75	89	61	220	66
	432	428	956	375	904	560

By means of the following table we are enabled to observe the comparative degree of severity with which different districts of the City have been visited. It should be compared with the corresponding tables in recent reports :—

1896.—Deaths and Death-rates from Diarrhœa in the various Divisions of the City.

Statistical Divisions		Estimated Populations	Deaths	Death-rates
City of Manchester		‡‡ **531,697**	**560**	**1·04**
I. Manchester Township		146,186	213	1·43
II. Northern Districts		139,013	112	0·79
III. Southern Districts		246,498	235	0·94
I.	Ancoats	45,991	78	1·67
	Central	36,584	62	1·67
	St. George's	63,611	73	1·13
II.	Cheetham	30,660	23	0·74
	Crumpsall	9,209	3	0·32
	Blackley	7,888	1	0·12
	Harpurhey	11,265	11	0·96
	Moston	6,338	2	0·31
	Newton Heath	36,602	24	0·65
	Bradford	22,461	30	1·32
	Beswick	10,602	11	1·02
	Clayton	3,988	7	1·73
III.	Ardwick	37,128	33	0·88
	Openshaw	29,686	31	1·03
	West Gorton	27,236	27	0·98
	Rusholme and Kirk	19,162	10	0·51
	Chorlton-on-Medlock	61,308	53	0·85
	Hulme	71,978	81	1·11

ON TUBERCULOSIS.

In the Report for 1895 I stated that, in my opinion, tuberculosis should be added to the list of notifiable diseases, with certain limitations as to the cases to be notified, and under certain conditions as to the use to be made of the information obtained. Accompanying this Report is a fuller statement of my views. What, however, is with us a mere opinion has become in New York an established fact, and I, therefore, give here an extract from a circular issued by the Health Department of that city, giving a brief statement as to what is being there effected. Facilities are also offered to practising physicians in obtaining diagnoses at the City Laboratory of cases in the earlier stage of the disease when there is a reasonable expectation of cure if the proper means are taken, and when, with a few simple precautions, its extension can be prevented :—

"On February 13th, 1894, the Board of Health passed a series of resolutions designed to assist in the accomplishment of its aims in the suppression of tuberculosis. One of these resolutions involved the reporting of certain classes of cases of tuberculosis, and, in compliance with it, 4,166 cases were reported in 1894, 5,818 in 1895, and 8,344 in 1896, and the Department was enabled, without opposition, and without the imposition of hardship upon individuals, to extend its educational influence and to protect a large number of persons from risks which, without such measures, must inevitably have led to further serious spread of the disease.

"In order to more firmly establish and to extend the work carried on under the measures above mentioned, on January 19th, 1897, the following amendment to the Sanitary Code was adopted by the Board of Health :—

"*Sec. 225.—That pulmonary tuberculosis is hereby declared to be an infectious and communicable disease, dangerous to the public health. It shall be the duty of every physician in this city to report to the Sanitary Bureau, in writing, the name, age, sex, occupation, and address of every person having such disease who has been attended by, or who has come under the observation of, such physician for the first time, within one week of such time. It shall also be the duty of the commissioners or managers, or the principal, superintendent, or physician of each and every public or private institution or dispensary in this city, to report to the Sanitary Bureau, in writing, or to cause such report to be made by some proper and competent person, the name, age, sex, occupation, and last address of every person afflicted with this disease who is in their care or who has come under their observation within one week of such time. It shall be the duty of every person sick with this disease, and of the authorities of public and private institutions or dispensaries, to observe and enforce all the sanitary rules and regulations of the Board of Health for preventing the spread of pulmonary tuberculosis.*

"This section of the Sanitary Code, in effect, gives legal force to the measures which had been provisionally adopted by the Board under resolutions three years earlier. It will be noted that in this section of the Sanitary Code pulmonary tuberculosis is classed as an 'infectious and communicable disease, dangerous to the public health,' and is not grouped with the contagious diseases.

"The following circular of information to physicians regarding the measures adopted by the Board for the restriction of this disease was originally published in 1894, and was then forwarded to every physician practising in this city. It is now reissued by the Department, after being slightly modified to correspond with the provisions of the above amendment. It describes, in sufficient detail for the information of physicians, the purposes of the Health Board and the scope of its work in relation to tuberculosis. The circular runs as follows :—

> "The communicability of pulmonary tuberculosis has been so thoroughly established, and is now so generally recognized by the medical profession throughout the world, that the Board of Health of New York City has determined to take active steps looking towards its prevention in this city, and has adopted the following measures :—
>
> "First.—The Health Department will hereafter register the name, address, sex, and age of every person suffering from tuberculosis in this city, so far as such information can be obtained, and will require that all physicians furnish such information to the Sanitary Bureau, as provided in the above section of the Sanitary Code (postal cards for reporting cases of tuberculosis will be forwarded on application). This information is solely for record, and in no instance will visits be made to such persons by the inspectors of the Department, nor will the Health Department assume any sanitary surveillance of such cases, unless the person resides in a tenement house or lodging house (unless in other cases the attending physician requests that an inspection of the premises be made). In no case where the person resides in a tenement house or lodging house will any action be taken if the physician requests that no visits be made by inspectors, and is willing himself to deliver circulars of information, or to furnish such equivalent information as is required to prevent the communication of the disease to others.
>
> "Second.—When the Health Department obtains knowledge of the existence of cases of pulmonary consumption residing in tenement houses or lodging houses (unless the case has been reported by a physician, and he requests that no visits be made), inspectors will visit the premises and family, will leave circulars of information, and instruct the person suffering from consumption, or the family, as to the measures

which should be taken to guard against the spread of the disease, and, if it is considered necessary, will make such recommendations for the cleansing or renovation of the apartment as may be required to free it from infectious material.

"THIRD.—In all cases in which it comes to the knowledge of the Health Department that rooms or apartments in tenement houses, lodging houses, etc., which have been occupied by a consumptive, have been vacated by death or removal, an inspector will visit the premises, and, when necessary, will direct the removal of infected articles, such as carpets, rugs, bedding, etc., for disinfection, and will make such written recommendations to the Board as may be required regarding the cleansing and renovation of the rooms or apartments. An order embodying these recommendations will then be issued on the owner of the premises, and compliance with this order will be enforced. No other persons than those there residing at the time will be allowed to occupy such rooms or apartments until the order of the Board has been complied with. Infected articles, such as carpets, rugs, etc., will, when necessary, be removed by the Health Department, disinfected, and returned without charge to the owner.

"FOURTH.—For the prevention and successful treatment of pulmonary tuberculosis, it is of vital importance that a positive diagnosis be made at the earliest possible moment. In order that the assistance afforded by bacteriological examinations of the sputa may be at the command of physicians in all cases *not under treatment in hospitals*, the Health Department is prepared to make such bacteriological examinations if samples of the sputa, freshly discharged, are furnished in clean, wide-necked, *well-stoppered* bottles, accompanied by a blank giving the name, age, sex, and address of the patient, the duration of the disease, and the name and address of the attending physician. Bottles for collecting the sputa, with blank forms to be filled in, can be obtained at any of the drug stores now used as stations for the distribution and collection of serum tubes for diphtheria cultures. After the sputum has been obtained, if the bottle, with the accompanying blank filled out, be left at any of these stations, it will be collected by the Health Department, the sputum examined microscopically, and a report of the examination forwarded to the attending physician free of charge. The information regarding cases of pulmonary tuberculosis obtained by the Health Department through such bacteriological examinations of sputum is solely for registration, and cases of pulmonary tuberculosis thus reported will not be visited by inspectors of the Health Department, nor will circulars be forwarded to them, without the special request of the attending physician.

"FIFTH.—The authorities of all public institutions, such as hospitals, dispensaries, asylums, prisons, homes, etc., are required to furnish to the Health Department the name, sex, age, occupation, and last address of every consumptive coming under observation within seven days of such time. The premises occupied by all persons reported by the authorities of public institutions as suffering with pulmonary tuberculosis will be visited by inspectors of the Health Department, and such action taken as seems necessary.

"SIXTH.—The authorities of all public institutions, such as hospitals, dispensaries, asylums, prisons, homes, etc., will hereafter be required to furnish to the Health Department the name, sex, age, occupation, last address, and duration of residence in the institution of every inmate suffering from consumption who is discharged from the institution previous to or on the day of such discharge.

"It is the earnest wish of the Board of Health that all practising physicians in this city co-operate with the Board in an intelligent and sustained effort to restrict the ravages of this, the most prevalent and formidable disease with which we have to deal.

"By order of the Board of Health.

"CHARLES G. WILSON,
"*President.*

"EMMONS CLARK,
"*Secretary.*"

As regards the conveyance of the disease in milk, our efforts may be directed to two chief points: one administrative, the other educational. The public should be educated not to allow children under existing conditions to consume milk which has not been boiled. This duty we have fairly well performed. In the second place, it must be our care to extirpate the disease from our farms as speedily as possible, in the interest of the farmer as well as of the consumer.

In effecting this object, we shall go a long way when we have got cows kept under conditions of scrupulous cleanliness, in cowsheds of sufficient size, properly lighted and ventilated. Probably, strict cleanliness is the most important measure to be observed in the prevention of bovine tuberculosis. We cannot hope, however, to get strict cleanliness without having properly constructed cowsheds.

I have already reported on these subjects, and next year I hope that we may have some administrative work to place on record.

ON THE FEEDING OF INFANTS.

In the middle of 1894 a handbill was distributed to the District Registrars of Births and Deaths throughout the City, giving instructions to mothers in the precautions which they ought to take when compelled by circumstances to have recourse to artificial feeding of their infants. These gentlemen were requested to be good enough to hand one of these bills to every mother who came to register the birth of a child. For a considerable time difficulty was experienced in inducing some of the registrars to remember that these bills were to be distributed; but gradually, from a sense of their usefulness, and also because they were increasingly asked for, their distribution became more systematic, so that for a considerable time past we have reason to believe that they have been regularly and systematically distributed. A measure of control has been exercised over their distribution to this extent, that when a death has occurred from diarrhœa, one of the questions invariably asked of the parent has been whether they have received a copy of this handbill, and of late the answer recorded has been almost invariably "yes."

Assuming, then, that the registrars have thus considerately given out these handbills systematically, there can be no question that a steady and important process of education has been going on in the community.

We should be able to see some effects from this work, and I have given some reason for believing (reason not final, nor, perhaps, quite convincing) that such an effect is perceptible. Still, however, a high mortality goes on amongst young children, and therefore this subject was particularly studied in connection with summer diarrhœa in a paper published in the *Lancet* of February 29th, 1896. It was manifest, in the course of the inquiry on which this paper was founded, that children artificially fed suffer from diarrhœa in an altogether preponderant degree—a degree which I endeavoured to measure; and a more particular investigation of the nature of the errors committed in the course of artificial feeding showed that the delusions of parents were not to be readily overcome by the distribution of handbills.

In the course of this year I had occasion to inquire into the connection between deaths described as due to tabes mesenterica and the course of feeding which had preceded them. I do not propose to enter into that subject here, further than to say that I was somewhat surprised at the number of instances in which the mothers represented themselves as having invariably boiled the milk given to their infants. If these were correct statements, then the children could not have contracted tabes mesenterica from cow's milk; while, on the other hand, an effect had to be ascribed to the system of popular instruction out of all proportion to what I had believed to be due to

it. It appeared to me that the subject required reinvestigation, with especial reference to this question of the boiling of the milk used by infants.

Just at this time it was suggested to me by one of the Lady Superintendents of the Ladies' Health Society that the Visitors of the Society, if suitably instructed, might do very good work precisely in this subject. On reflecting over the suggestion, I came to the conclusion that it would be well to give it a trial, more especially as the Ladies' Health Society had already done excellent work in educating people in this matter. It seemed probable, also, that the Visitors of the Ladies' Health Society would better be able than men to perceive when a hasty answer was given to a question of fact.

I have, therefore, had an inquiry made by two Visitors of the Society into the whole subject of infant feeding on the same lines as I had previously followed with the Sanitary Inspectors, and subsequently with Dr. Tonkin. In effect, this has been exceedingly well carried out, and bears on its face the marks of care and accuracy.

I have also, in addition, had an inquiry made into this particular point: how far do parents actually boil the milk which they give to their children? This special point has been inquired into by the Health Visitors generally. It relates to one particular matter, in whch they were carefully instructed as to the sources of error, and was, of course, a much simpler inquiry than the other. Nevertheless, I am not satisfied, from the examination of the papers, that it has been carried out so well, although, probably, the average value of the answers is fairly high.

Both inquiries relate to the poorer districts of the City, and cannot be taken to be generally applicable without considerable allowances.

Inquiry into the manner in which infants are found in course of being fed.

As regards the question of the boiling of cow's milk, which has, of course, special importance in connection with tuberculosis, it would seem that the parents themselves must have previously imagined that the addition of raw milk to bread boiled in water was equivalent to boiling the milk. At all events, it was found that this was a prevalent method of preparing the food of infants. The inquiry was a house-to-house one, and related purely and simply to the food on which children under two years of age were actually in process of being fed. The results of the majority of the returns are exhibited in the following table.

STATEMENT OF THE RESULTS OF AN INQUIRY MADE INTO THE FEEDING OF 870 CHILDREN UNDER 2 YEARS OF AGE BY THE VISITORS OF THE LADIES' HEALTH SOCIETY.

Ages	Under 1 month	1 month	3 months	6 months	9 months	12 months	18–24 months	Total
Breast-fed entirely	18	56	96	84	24	24	1	303
Partly breast and partly hand fed	1	16	32	65	61	120	34	329
Hand-fed entirely.....	1	5	16	23	22	102	69	238
								870
Condensed milk	...	6	6	6	6	16	4	...
Cow's milk used regularly, wholly or in part, mostly in bread.....	...	7	27	45	36	90	32	...
Anything going.....	...	...	1	14	22	114	76	...
Other foods, not including meat	2	5	16	23	24	52	23	...
Is the cows milk when used always boiled before use, Yes	1	2	14	20	21	48	13	...
Is the cows milk when used always boiled before use, No.	...	8	17	41	31	78	41	...
Cow's milk used but not regularly	1	3	4	16	16	36	22	...

This table relates to 870 children.

It will be seen that, up to the age of 6 months, the majority of children are fed entirely at the breast, as may be clearly gathered from the number of children entirely breast-fed at the ages of 6 to 9 months. On referring to my paper on diarrhœa, I find that, in the Inspectors' return, the age at which breast-fed children cease to preponderate is 11 months; in the return prepared by Dr. Tonkin and myself, 9 months. The recent inquiry agrees, therefore, with the latter, the age period coming in fact somewhat lower. Inasmuch as deaths are not taken into account in the inquiry made by the Health Visitors, it would appear that children cease to be fed entirely at the breast in the poorer districts earlier than over the City generally.

As regards actual boiling of the milk, it appears that, practically at every age, the milk itself is not invariably boiled in the majority of instances, although this is done in more than a third of all the cases, and we may confidently hope to find that this precaution will be carried out in an increasing number of instances.

It will be seen that, as regards the food which young children receive, the above table gives a very complete picture, if we remember that the heading "Other foods, not including meat," includes gravy, rusks, bread and butter, and so forth; while the heading "Anything going" includes also meat.

The danger arising from this cause would seem to be already serious at the third month of life. When poor children are fed on cow's milk, this would appear to be given mostly in the form of pobbies—that is to say, bread and water heated to boiling, over which milk has been poured.

Column 3 shows the proportion of instances in which condensed milk was being used.

It will be noted that 278 children under the age of 12 months had been fed entirely at the breast, as against 242 who were being fed partially at the breast or altogether on other food. Of the 242, 175 were found to have been fed partly at the breast up to the time of the visit, leaving 67 who were being fed on other foods, including milk.

Inquiry into the history of feeding of 617 children under two years of age.

Turning, now, to the house-to-house inquiry which was made into the feeding history of children under two years of age by two of the Health Visitors, and which, as I have said, bears on it the marks of care and thoroughness, we have a mass of information, of which it is by no means easy to convey an idea by any mode of analysis.

The particulars collected enable us to obtain an idea of the mode in which children are fed, and of the effect on health which the various conditions enumerated have had. There can, of course, be no doubt about the disastrous effects of bad feeding, bad clothing, and insanitary surroundings, and it is therefore somewhat surprising to note the number of strong, healthy children who are found under conditions all of them adverse. As regards the inquiry into the origin of the parents, the great bulk of them have been born in Manchester, and there is no appreciable difference noted between the condition of the children of natives and immigrants.

Then, again, as to the mode in which children are fed artificially with milk, the children to whom this inquiry relates have not been most commonly fed by bottle. It has more usually been by spoon, as, indeed, follows from the fact that milk is generally given in the form of pobbies. The actual numbers are—183 children fed by spoon to 140 fed by bottle. Feeders are, practically, not used. Children fed at different times by both methods are reckoned twice. The children fed on the spoon have, practically, been nearly all fed with bread and milk, with the exception of a few, who have had sago. Those fed by bottle have mostly had only cow's milk, less frequently condensed milk, of which Nestle's (or some form of Swiss milk) appears generally to be used, and, less frequently still, Neave's Food.

Of the degree of error committed by poor mothers in feeding their infants, an idea may be obtained by taking the history of 100 consecutive cases, and noting what has occurred.

First, as regards the age at which they have commenced to feed their children on pobbies, we find as follows :—

Pobbies and Breast.	Pobbies alone.
Case 4—After 4 weeks	Case 44—After 5 months
,, 9— ,, 2 months	,, 48— ,, 1 month
,, 26— ,, 5 months	,, 60— ,, 1 month
,, 30— ,, 1 month	,, 62— ,, 3 months
,, 38— ,, 4 months	,, 69— ,, 14 days
,, 81— ,, 5 months	,, 72— ,, 7 weeks
,, 82— ,, 4 months	,, 76— ,, 7 days
	,, 90— ,, 2 days
	,, 98— ,, 3 weeks
	,, 99— ,, 3 months
	,, 100— ,, 7 weeks.

Let us now pick out the instances in which the children have received part of what was going before the age of nine months. Let it be observed that to a young mother the temptation is great to give an infant a variety of articles, the infant stuffing everything into its mouth, so that it becomes an impulse for the mother to do the same. Moreover, after a few months the child cries when it sees other people eating, and makes attempts to get at the articles consumed, attempts which the parents are apt to regard as the result of a justifiable instinct. The facts are these. The child received—

Anything going with the Breast	Anything going alone	Crust of Bread with the Breast
No. 7—After 4 months	No. 20—After 7 months	No. 27—After 5 months
,, 31— ,, 4 ,,	,, 59— ,, 5 ,,	,, 29— ,, 6 ,,
,, 41— ,, 7 ,,		,, 47— ,, 5 ,,
,, 42— ,, 7 ,,		,, 52— ,, 5 ,,
,, 75— ,, 8 ,,		,, 71— ,, 8 ,,
,, 84— ,, 6 ,,		,, 73— ,, 5 ,,
,, 85— ,, 6 ,,		,, 74— ,, 7 ,,
,, 88— ,, 7 ,,		,, 77— ,, 6 ,,
,, 89— ,, 5 ,,		,, 83— ,, 5 ,,
,, 94— ,, 7 ,,		,, 91— ,, 6 ,,
,, 97— ,, 5 ,,		,, 95— ,, 5 ,,
		,, 96— ,, 4 ,,

Probably these figures give a fair idea of the kind and degree of errors committed in feeding infants, although, in exceptional instances, mothers begin to feed their infants with scraps from the family meal within a few weeks.

I have already treated on this subject in my paper on diarrhœa, in which I have inserted a description by Dr. Tonkin of the manner in which parents feed their children, as based on an inquiry which he carried out for me in

1896. According to him they would seem to be guided by no kind of rule, and there is an immense amount of ignorance and prejudice in this vital matter.

Not only, however, are these active errors committed, but there is a passive error which is, doubtless, often the cause of summer diarrhœa in sucklings. A very large section of infants "posset" their food, which drops on their clothing, and, unless the clothing be frequently changed, the saturated clothing may become the seat of bacterial growth, such as no doubt occurs in cow's milk, and sets up diarrhœa. It is thus necessary for the mother, if she wishes to avert this fatal disease from her infant, besides the other precautions which she may take, to be at particular pains to prevent the clothing of the infant from becoming or remaining dirty, as it is quite certain to be inserted into the mouth of the infant and sucked. In fact, strict cleanliness in this as in other particulars is necessary, as well as a proper choice of food.

A question which has given rise to much discussion has been the habit of mothers of resuming their work, especially in cotton mills, soon after the birth of a child; hence the occupation of the person attending the child, whose history was being inquired into, was in each case ascertained. Much to my surprise, I find that in almost every instance the child was nursed by the mother, which is the more remarkable, as many of the people in the districts visited work in mills.

With the following 15 exceptions amongst the first 200 children, the mother nursed her child herself:—

Case 39	—Nursed by	grandmother.	Mother died.
,, 44	,,	,,	Mother a millworker.
,, 48	,,	neighbour.	First two months by mother.
,, 60	,,	,,	First six weeks by mother—millworker.
,, 72	,,	,,	First seven weeks by mother—millworker
,, 98	,,	,,	First three weeks by mother—in warehouse.
,, 104	,,	grandmother.	First three months by mother—millworker.
,, 125	,,	,,	First month by mother—millworker.
,, 132	,,	,,	First month by mother—millworker.
,, 140	,,	neighbour.	First five months by mother—in warehouse.
,, 157	,,	grandmother.	First month by mother—sempstress.
,, 169	,,	neighbour.	First fourteen days by mother—millworker.
,, 170	,,	,,	First month by mother.
,, 172	,,	aunt.	First six weeks by mother—in warehouse.
,, 175	,,	neighbour.	First four months by mother—millworker.

It will be seen that out of the 14 mothers living as many as eight worked in the mill, three were in a warehouse, one was a sempstress, and in two the occupations are not stated.

Next, as to the manner in which these children are clad. In order to save heat, and thus to retain digestive vigour, as well as to allow the child to obtain, while developing, the full advantage of the food which he receives, the body should be covered, including the arms and legs, with a woollen garment, which should not be too heavy, nor fit so tightly as to impede the movements of the chest. It is essential, also, that the woollen garment should not be allowed to get dirty or moist, otherwise the inter-fibral spaces which act as non-conductors of heat lose that property. Such a garment as I have mentioned would go far to overcome many of the digestive troubles to which young children are liable. It is, therefore, of interest to know in what proportion such garments are used by the poorer classes. Picking out only instances in which the statement on this subject is clear and explicit, we find that in 290 instances young children were clad in cotton garments, of which 98 were dirty; and in 140 in flannels, of which 21 were dirty.

It may be admitted that matters might be much worse in respect of cleanliness; although it is much to be desired that poor parents would make an effort to get good woollens for their infants.

No inference can be drawn from this inquiry as to the influence of dress on the strength of children. On the contrary, it is the weaker children that are most usually clothed in flannel, which must be taken to mean that the parents are aware of the effect that suitable dress has upon the health of children. It is just as necessary, however, to conserve the strength of strong children as it is to protect the weak, and all young children should be clothed in clean woollens. It may, I think, be assumed that flannel in this inquiry means woollens.

What, now, are the connections of parentage with the physical vigour of the children? The total number of children inquired into in this regard is 617. Of these, 550 were born of parents who had always lived in Manchester, 67 of parents who had migrated to the City at periods before the inquiry, varying from 24 years to a few months—the most common periods being from five to eight years, though there were a few who had quite recently migrated.

Of the 550 children born of Manchester parents, 414 are recorded as being of strong constitution, and 136 as weak, or not quite one-fourth of the total.

Of the 67 children of immigrants, 48 are given as strong and 19 as weak, or considerably over a fourth of the total.

So far as these figures go, it would not seem that the children of immigrants enjoy as good health, when exposed to the same insanitary conditions, as the children of natives, a result much opposed to ordinary impressions. At all

events, the figures do not go to support the view of a necessary degeneration of physique under the circumstances of town life, while they hold forth the strongest inducements to pursue a vigorous policy of sanitary improvement.

It is very difficult to draw any conclusion as to the connection between any of the particulars recorded and the vigour of the child. Thinking that probably the state of cleanliness of the child would give some indication of the care or carelessness with which it was being treated, I have taken the observed state of weak living children, and I find that 42 of these were found clean, as against 16 who were in a dirty condition. This certainly shows a higher proportion of dirty children than was found for all the children, strong and weak, the numbers being—clean 311, dirty 119; but not so much so as to permit of any inference.

In the same way there is observable a connection between a crowded and insanitary condition of the home and the condition of the child; but it is not so marked or constant as to permit of numerical statement. Strong, healthy children are often found under the most unfavourable conditions as regards home, dress, and even feeding; and although their unfavourable circumstances must tell on these as time goes on, the good stock from which they have come has started them with sufficient energy to struggle along successfully so far.

The question of the strength of the children is, however, the weakest part of the inquiry, and it must be admitted that the standard of these ladies for a strong child cannot be a high one.

I propose now to submit this inquiry to the test of figures. In a paper on summer diarrhœa, I obtained two sets of figures for the facts of the feeding of children: one based on an inquiry by the Sanitary Inspectors, the other on an inquiry made by Dr. Tonkin and myself, on lines which I laid down. The inquiry was directed to ascertain, as nearly as possible, the length of time during which infants were fed at the breast entirely, the time during which they were so fed partially, and the time during which they were altogether artificially fed.

Supposing a child was fed at the breast entirely for three months, partially up to the age of eight months, then entirely artificially up to the age of twelve months, it would be entered under three headings, thus :—

BREAST-FED ENTIRELY.

Under 1 month	1 month	2 m'ths	3 m'ths	4 m'ths	5 m'ths	6 m'ths	7 m'ths	8 m'ths	9 m'ths	10 m'ths	11 m'ths	12 m'ths
1	1	1	...	...	...	...	...	...	...	...	...	...

Similar entries being made under the other headings, thus :—

BREAST-FED PARTIALLY.

1 m'th	2 m'ths	3 m'ths	4 m'ths	5 m'ths	6 m'ths	7 m'ths	8 m'ths	9 m'ths	10 m'ths	11 m'ths	12 m'ths
...	...	...	1	1	1	1	...	...	...	...	...

Then all the entries in each column were added, and in this way the number of months lived by all the children under the respective conditions of living was obtained approximately.

Then it was considered permissible to say that these numbers could be taken as representing the relative numbers of children living under the respective conditions of feeding at the different ages, so far as that could be revealed by the figures at my disposal. This is, in fact, a statistical device for making the utmost of the materials available.

In this way we obtain that the following were the relative numbers of children under the respective circumstances of feeding, according to the particulars obtained by Dr. Tonkin and myself, in respect of 400 children :—

ENTIRELY BREAST-FED.

Under 1 month	1 m'th	2 m'ths	3 m'ths	4 m'ths	5 m'ths	6 m'ths	7 m'ths	8 m'ths	9 m'ths	10 m'ths	11 m'ths
390	333	288	265	238	148	115	90	51	31	20	10

PARTLY BREAST-FED.

Under 1 month	1 m'th	2 m'ths	3 m'ths	4 m'ths	5 m'ths	6 m'ths	7 m'ths	8 m'ths	9 m'ths	10 m'ths	11 m'ths
23	23	45	69	77	95	163	172	189	196	194	184

ENTIRELY HAND-FED.

Under 1 month	1 m'th	2 m'ths	3 m'ths	4 m'ths	5 m'ths	6 m'ths	7 m'ths	8 m'ths	9 m'ths	10 m'ths	11 m'ths	12 m'ths
34	36	46	53	54	52	54	55	53	62	67	73	93

The following were the relative numbers obtained from the Inspector's inquiries into 1,000 children :—

ENTIRELY BREAST-FED.

Under 1 month	1 m'th	2 m'ths	3 m'ths	4 m'ths	5 m'ths	6 m'ths	7 m'ths	8 m'ths	9 m'ths	10 m'ths	11 m'ths	12 m'ths
766	675	627	555	507	456	456	345	297	208	152	121	...

PARTLY BREAST-FED.

Under 1 month	1 month	2 m'ths	3 m'ths	4 m'ths	5 m'ths	6 m'ths	7 m'ths	8 m'ths	9 m'ths	10 m'ths	11 m'ths	12 m'ths
33	37	32	84	105	106	164	168	173	187	194	185	...

ENTIRELY HAND-FED.

Under 1 month	1 month	2 m'ths	3 m'ths	4 m'ths	5 m'ths	6 m'ths	7 m'ths	8 m'ths	9 m'ths	10 m'ths	11 m'ths
78	96	104	109	115	118	124	120	119	138	154	161

I will now give the corresponding figures for an analysis of 560 children inquired into by the Health Visitors :—

ENTIRELY BREAST-FED.

Under month	1 month	2 m'ths	3 m'ths	4 m'ths	5 m'ths	6 m'ths	7 m'ths	8 m'ths	9 m'ths	10 m'ths
468	411	357	287	244	211	152	129	100	66	37

PARTLY BREAST FED.

Under 1 month	1 month	2 m'ths	3 m'ths	4 m'ths	5 m'ths	6 m'ths	7 m'ths	8 m'ths	9 m'ths	10 m'ths
20	64	89	116	131	149	175	171	186	189	178

ENTIRELY HAND-FED.

Under 1 month	1 month	2 m'ths	3 m'ths	4 m'ths	5 m'ths	6 m'ths	7 m'ths	8 m'ths	9 m'ths	10 m'ths
44	55	62	57	54	49	54	54	52	59	63

The following features are observable in the summary, thus presented, of Dr. Tonkin's inquiry when compared with that made by the Sanitary Inspectors :—

The decline in the number of children fed entirely on the breast from the 1st to the 11th month is much more rapid in the former.

The number of children partially fed on the breast is comparatively high at every month of age in Dr. Tonkin's inquiry.

The proportion of children entirely hand-fed at the different months of age is sufficiently nearly the same in Dr. Tonkin's inquiry and in that carried out by the Inspectors to make it plain that no serious discrepancy enters here.

As regards the other discrepancies, there is no doubt whatever that the Inspectors erred in accepting the statement of the mothers too readily that their children had been entirely breast-fed.

Now the figures obtained from the Health Visitors' statement approximate much more nearly to Dr. Tonkin's inquiry—which erred, if anything, on the side of rigour—than to those obtained by the Inspectors.

On the other hand, the proportion of children entirely hand-fed at the more advanced months is few as compared with the number shown in Dr. Tonkin's table. That is, however, partly due to the larger number of deaths which takes place amongst hand-fed children in Ancoats, and partly because a larger proportion of the infants are, in reality, kept at the breast entirely or partially. A very large number indeed of mothers are reported as partly suckling their children to 16, 17, 18 months, and even to more advanced ages.

It appears to me undesirable to pursue this subject further into detail at present; although, besides giving us an idea of what is being done in Ancoats in some important points as regards the nurture of infants, this inquiry has supplied valuable hints on the direction which popular instruction ought to take, which have been incorporated in the handbill on summer diarrhœa recently sent to every household, and which will also, at the earliest opportunity, be added to the paper of instructions on infant feeding.

ON THE MILK SUPPLY OF THE CITY.

From a calculation made by Mr. Rook, the Superintendent of the Sanitary Department, it appears that we may estimate the annual milk supplied to the City at 8,640,076 gallons, which is equivalent to 16¼ gallons per head. Of this, about a third is produced within this City.

When, from any cause, an infant under one year of age has to be fed artificially, the staple of its diet is cow's milk. It is true a great miscellany of unsuitable material is added; but even amongst the poorest people, the chief article substituted for breast milk is cow's milk. Now it has been long recognised that, unless special precautions are taken, children are liable to be seriously injured by the use of such milk. Chief amongst the risks inherent in milk is the introduction of dirt, with consequent degenerative changes, arising from dirty conditions of the cowshed, cow, milkman's hands and pails, as well as in transit, and subsequently on the premises of the retailer. It is probable that this is the most serious mischief which milk inflicts. It must not be supposed that such danger attends only the use of milk, although milk which has become contaminated is more perilous than most foods.

Nevertheless, other foods are also a source of danger from contamination unless cleanliness is observed.

Again, milk may serve as the medium for conveying tuberculosis to children. This particular risk might be avoided if parents would take the precaution of boiling all milk given to young infants. The handbill on infant feeding (distributed to all parents when they come to register the birth of an infant) puts stress on this procedure, but probably not sufficiently to counteract the tendency which many mothers have to neglect essential points.

There will always be a considerable proportion of people who will object so strongly to the taste of boiled milk that they will rather run the risk of disease than have it boiled. In a statement placed before the Council, I have given reasons for believing that tuberculosis is contracted by children from the use of milk, while the examination of milk from diseased cows in Manchester cowsheds carried out by Professor Delépine makes it very clear that a number of our cows are unfit to supply milk to children.

There is no wish to exaggerate the magnitude of the evil, and it must be clearly understood that the milks examined by Professor Delépine were obtained under Mr. King's supervision from cows selected by him as being markedly diseased. The proportion of the milks so obtained which was found to be infected with tubercle to such an extent as to convey the disease to guinea pigs was 25 per cent.

What I was concerned with in this investigation was to show the reality of the mischief done by the worst cows present in Manchester cowsheds. No idea is thus conveyed of the extent of the mischief.

Now Dr. Hope, the Medical Officer of Health for Liverpool, has also had an investigation carried out at the same time of milks brought in from the country, as well as of milk produced in the city. As I understand his report, no special selection was made of the milks, those brought from outside being obtained mostly at the railway station.

The milks were sent to four bacteriologists of high standing, without any information, and by these gentlemen were tested for the presence of tubercular infection. The result of their joint reports is that 29·1 per cent. of the imported milks were found to be infective, as compared with 2·8 produced in the city.

Now it is true that the cows kept within the city are, on the average, much freer from tuberculosis than the cows kept in the country, and that for a sufficient reason—cows kept in the city are very largely purchased as young animals, as free from disease as can be got. They are milked for one year, and are then killed. In this way the risk of heavy loss by tubercle is avoided, while the milk is correspondingly less infected.

The cowkeeper outside the city does not follow this policy. He breeds from his cows, which consequently remain in the cowshed after they have become highly infected, and so infect the young stock in their turn. There is no doubt now, in my mind, that the milch cows outside the city are more tuberculous, on the average, than those inside—*at all events on many of the milk farms which supply our great towns.*

Doubtless, also, in Liverpool the energetic measures which Dr. Hope has taken to keep the cowsheds in good order will have a decided effect in lessening the amount of tuberculosis in the cowsheds.

If, however, animals are to remain free from disease, whether in town or country shippons, certain elementary requirements must be fulfilled. They must have abundant air space and light, and, above all, the cows and cowsheds must be kept scrupulously clean.

In October, 1896, new regulations came into force in this City dealing with the conditions of milk keeping, and an effort has been made to improve these generally. But no special action has yet been taken in respect of structural alterations required by the regulations, except that one cowshed has been closed, and that another is about to be. A great improvement has taken place in the cleanliness of the cows and cowsheds in some of the worst shippons. But the real pinch of bringing the new regulations into effective action has yet to come. In the report on Manchester cowsheds presented to the Sanitary Committee, I have given particulars in reference to the action taken by Mr. King in respect of diseased animals.

In a fuller discussion of the subject, I would refer to the reports already presented to the Committee, viz. :—

(*a*) Statement on the facts of tuberculosis so far as they relate to cattle.

(*b*) Report on the Manchester cowsheds, &c.

Reverting to the remarkable results of the investigation made by Dr. Hope, of Liverpool, it is quite clear that no partial measures in this or that other place will adequately meet the situation, and it is, I think, becoming a general feeling that an independent Public Health Veterinary Service is required to deal with the various conditions affecting the health of the cattle about our farms, as well as the milk supply of our towns. Such Public Health Service, it is felt, should be directly responsible to some central authority, such as the County Council or the Local Government Board. This is needed as much in the interests of the farmer as in that of the town population.

As regards the City of Manchester, I do not think there is any doubt that the Sanitary Committee are prepared to demand from cowkeepers within the City a compliance with the regulations, and that they are prepared to give me a very thorough support to that extent.

I would refer, with great satisfaction, to the fact that the milk for Monsall Hospital is obtained from a herd guaranteed free from tuberculosis, and housed in an adequate and suitable manner.

ON UNHEALTHY DWELLINGS.

It has now become the settled policy of the Manchester Corporation gradually to deal with back-to-back houses, either by closing them altogether, or by altering them in such a manner as to provide through ventilation and backyards of a sufficient size with doors opening into them.

In a report presented to the Committee in 1893, your previous Medical Officer of Health laid down certain conditions under which alterations to this class of house should be provided. Neither then, however, nor subsequently have these been strictly adhered to, although an effort has been steadily made to approximate to them, and to adhere to their spirit, where it has not been possible to follow their letter. In that report were given certain schemes of alteration which have served as a basis for procedure. Preference has been, of late, given to the earlier proposals suggested, it being considered desirable to have as much ground as possible at the back of the houses assigned to yard space.

In an inquiry published in the Annual Report on the Health of Manchester for 1894, I endeavoured to assess with some degree of precision the mortality prevailing in back-to-back houses as compared with through houses in their immediate neighbourhood, and thus to fill up a gap which had been pointed out by Dr. Barry in his report on back-to-back houses. In common with Mr. Herbert Jones in his excellent report on the same subject, I found that, under like conditions in other respects than the circumstance of the house being back-to-back, the mortality was higher in back-to-back than in through dwellings.

Apart from their unhealthiness, however, the closet accommodation provided for this class of dwelling is such, and so situated, as alone to condemn them as unfit for habitation.

A considerable amount of feeling has been of late manifested against closing and altering these dwellings, and towards the close of 1896 Alderman Walton Smith was requested to furnish the Committee with a statement on the subject. Such a statement was, accordingly, presented by him to the Committee, bearing date January 12th, 1897, in which the course of action pursued by the Committee was fully set forth.

This statement has already been placed in the hands of every member of the Council, and it is therefore almost sufficient here to allude to it. I may be permitted, however, to quote a portion of it which deals with the causes of the dissatisfaction which has lately arisen in the minds of a section of the public, along with the Appendices B and C referred to below.

"Now, wherever the Unhealthy Dwellings Sub-Committee have in recent years sanctioned alterations the results are far different. The inhabitants of these altered houses enjoy a fair amount of yard space, which is now covered with an impermeable floor, and contains a water-closet of approved type. The circulation of air about the back of the houses is free, and the houses communicate with the yard, so that a current of pure air, such as Manchester can afford, passes through them.

"The houses themselves are put into a satisfactory condition of repair. Altogether, they may safely be said to enjoy better conditions in respect of health than a great number of houses which were previously through.

"Recently a considerable amount of prejudice against these operations has arisen, owing to the fact—for fact it is—that there is a great demand for houses in the City, and that nearly all the available houses are occupied. It is stated that the operations of the Sub-Committee have brought about this state of things, and it is said that to close houses only leads to overcrowding.

"Now any operations for the removal of insanitary property will necessarily lead to temporary crowding under existing conditions. So much is incontestable. And where houses cannot be got by displaced tenants, a great deal of inconvenience and dissatisfaction will necessarily arise.

"This inconvenience and dissatisfaction are, however, in a large number of cases only temporary; and, if they were not, the question arises, can they be weighed in the balance against the removal of existing conditions so plainly insanitary and demoralising?

"Then, again, it must be asked whether the dissatisfaction does not arise from an entire misconception. At the Census of 1891 there were over 5,000 uninhabited houses. At the present time an uninhabited house of the artizan class is scarcely to be encountered. Rents have risen in consequence, and building is going on rapidly both in the City and on its outskirts.

"The operations of the Committee will in no way account for this state of things, which must in truth be put down to the great increase of trade. (Appendix B.)

"But, if this be so, then the pressure for houses, and the difficulty which dispossessed tenants experience in finding houses, are due, not so much to the operations of the Committee, but rather and mostly to the expansion of trade.

"The pressure, crowding, and displacement of tenants may be regarded as inevitable, apart altogether from the operations of the Unhealthy Dwellings Sub-Committee.

"The rapid growth of population which is now taking place is believed by the Secretary to the Chamber of Commerce to arise mainly from two causes, viz., the Ship Canal—to which he accredits altogether a supplemental increase of the population by 20,000, of which some 12,000 may belong to Manchester; and the growing importance of Manchester as a distributing centre both for England and foreign countries. I append an extract from an article written by him. (Appendix C.)

"APPENDIX B.

"In the following table is set forth the number of houses empty in the different registration districts at the time of the Census, 1891, and the number of houses closed by the operations of the Unhealthy Dwellings Sub-Committee in each district.

"It will at once be seen that these operations, which are set forth in the third and fourth columns, are inadequate to account for the pressure for dwellings, apart altogether from the large number of new houses recently erected.

"Health Office and Sanitary Department,

"December 21st, 1896.

"*Statement showing the Number of Houses empty at the Census-taking in 1891, the Number Demolished, the Number Temporarily Closed, and the Number Ordered to be Closed, but not yet Closed, by the Unhealthy Dwellings Sub-Committee from January 1st, 1891, to December 19th, 1896, in the respective Registration Districts; also the Number of Houses Demolished in the various Areas dealt with under the Working Classes Acts.*

Registration District	No. of empty houses at Census 1891	No. of houses demolished	No. of houses temporarily closed until satisfactory alterations are made	No. of houses ordered to be closed but in which the orders have not been issued, the owners having arranged to alter	No. of houses demolished in the various areas dealt with under the Working Classes Acts
					†
Ancoats	732	193	234	243	585–419=166
Central	620	174	358	50	...
Saint George's	605	110	176	...	14
Cheetham	335	1	3	...	...
Crumpsall	76	...	...	...	...
Blackley	67	...	6	...	...
Harpurhey	71	...	...	...	...
Moston	38	...	...	...	...
Newton Heath	228	24	7	43	...
Bradford	104	2	1	...	...
Beswick	43	...	...	...	...
Clayton	18	...	...	...	...
Ardwick	311	7	11	...	...
Openshaw	199	1	11	...	...
West Gorton	205	2	24	...	...
Rusholme and Kirkmanshulme	170	13	8	...	...
Chorlton-upon-Medlock	731	116	258	25	117
Hulme	626	141	115	229	33
TOTALS	5,179	784	1,212*	590	†749–419=330

* A number of these houses are undergoing alterations which, when completed, will meet the requirements of the Corporation, and will be reopened.

† To replace the 749 houses demolished under the Housing of the Working Classes Acts, 419 have been already erected in Oldham Road and Pollard Street, and the Committee are now considering the erection of additional blocks.

"W. H. Roos.

"The Medical Officer of Health. "H. Dale.

"*New Building Operations.*

"The following letter contains the figures, so far as the City is concerned, but it must be remembered that building is going on very rapidly outside the boundary, especially in the districts of Withington, Didsbury, Chorlton-cum-Hardy, Stretford, and Levenshulme. There has also been a considerable increase of building in Salford.

"December 22nd, 1896.

"The Medical Officer of Health.

"Dear Sir,—In reply to your letter of the 22nd instant, I beg to inform you that the new dwelling-houses within the City, certified as fit for human habitation between 1891 and 1895, are as follows:—

"November,	1890,	to 31st October,	1891	123
,,	1891	,,	1892	899
,,	1892	,,	1893	682
,,	1893	,,	1894	713
,,	1894	,,	1895	1088
,,	1895	,,	1896	1951

"Yours faithfully,

"(Signed) T. DE COURCY MEADE,

"*City Surveyor.*

"APPENDIX C.

"*Extract from Article in the 'Financial Commercial Chronicle,' June, 1896 (a New York Publication).*

"In the following table the number of people dwelling within the registration districts of Manchester, Salford, Prestwich, Barton, and Chorlton, and the sub-districts of Heaton Norris, Altrincham, Wilmslow, and Hyde, is shown at each Census of the present century, as well as the increase and increase per cent. in each decade:—

	Population		Decennial Increase		Increase Per Cent.
1801	143,738	...	———	...	———
1811	173,634	...	29,896	...	20·7
1821	230,700	...	57,066	...	32·8
1831	324,722	...	94,022	...	40·7
1841	416,734	...	92,012	...	28·3
1851	526,018	...	109,284	...	26·2
1861	621,975	...	95,957	...	18·2
1871	718,099	...	96,124	...	15·4
1881	876,217	...	158,118	...	22·0
1891	998,763	...	122,546	...	13·9

"If it be assumed that the rate of increase shown in the last of these decades—12,255 per annum—and no more, has continued during the last five years, it will appear that the present population of the area in question is 1,060,038. But the opening of the Manchester Ship Canal at the beginning of 1894 has added to it a large number of persons connected, directly and indirectly, with the service of the new port. Estimating this accretion on the basis of the tonnage of the port, it can hardly be put down at less than 15,000.* The figures just written may therefore be increased to 1,075,038. It is very probable that the new business, and the augmented population due to the traffic of the Canal, are an important cause of the evidences of building extension now visible."

The following cutting from the *Manchester Guardian* of July 7th, 1897, serves to supplement the above statement :—

A Year's Trade.

The annual statement of the trade of the United Kingdom with foreign countries and British possessions during 1896 was published yesterday as a Blue Book. The total imports were of the value of £441,808,904, and the exports £296,379,214, making a grand total of £738,188,118. Raw cotton imports increased from £30,429,428 in 1895 to £36,272,039 last year, while cotton yarn imports fell from £379,349 to £296,059. Piece goods increased from £833,025 to £1,040,748, and other kinds of cotton manufactures from £2,147,951 to £2,484,361. The export statement shows that the value of piece goods (unbleached grey) exported in 1896 was £16,712,368, against £15,582,186 in the previous year. Bleached white piece goods rose from £11,758,340 in 1895 to £12,588,416 last year; printed goods from £10,498,765 to £11,519,498; and dyed from £8,918,155 to £10,359,964. The book also gives the value of imports into the port of Manchester, the amount of customs revenue received last year being £236,969, compared with £231,242 in 1895. The value of the imports of foreign and colonial merchandise into Manchester rose from £2,790,129 in 1894 to £4,220,792 in the following year, while last year's return is no less than £7,732,416.

There are two ways of looking at the question of closing houses which really need to be closed, and either removed or reconstructed.

One of these is to say that these poor people should not be dispossessed until other dwellings have been provided for them, and the other is to close the houses as an incentive to the erection of suitable dwellings. A wave of prosperity, such as that which has recently flowed over Manchester, has the

* Present estimate, 20,000.

same effect in the way of dispossessing a large number of people who cannot pay the rent asked for, while it leads, not perhaps with the rapidity to be desired, to a great increase of fresh building operations in and around the City.

It is to be hoped that the increment of wealth coming into the City will not become the means of arresting salutary changes in the housing of the people.

Schemes for the erection of dwellings for the labouring classes, as well as for a model common lodging-house, are now before the Local Government Board. There is no doubt that good lodging-houses are very much needed in Manchester, and I have therefore had an investigation made by Dr. W. B. Mercer on a group of lodging-houses in Angel Meadow and its neighbourhood, from which it appears that there is a great deficiency of day-room accommodation, as well as of suitable provision in respect of closets and of conveniences for personal cleanliness.

A statistical return, prepared for me by Mr. Roos, shows that the average annual death-rate for three successive years of persons removed from these houses certified as suffering from phthisis was over 20 per 1,000. It is certain that these houses afford favourable occasion for the spread of this disease.

There are two circumstances affecting the houses of the City generally to which I would more particularly direct attention. One of these is the condition of the closets. It is not too much to say that the present system of collecting excreta leads sooner or later to the saturation with urine of the soil adjoining the majority of buildings which are furnished with pail-closets or middens.

It will be evident from a perusal of the particulars relating to the infectious diseases that the arrangement made between the Sanitary Committee and the Cleansing Committee for the replacement of defective or absent urine guides has in large measure failed of its object; and that, in fact, urine is allowed to flow undisturbed into the ground in the neighbourhood of houses in spite of the great amount of work done.

The expense of repairing even this inherent fault alone would, I presume, entail too great an expense.

I am not unaware of the difficulties attending the introduction of water-closets, but, if the details of construction are properly attended to, no adverse consequence could possibly reach the magnitude of the evils now existing. It is, at the same time, of vital moment that the water-closets should be efficient, and that they should be fixed under proper and responsible supervision.

At the same time the ground should be reconstructed. The sodden material about the closets should be thoroughly disinfected, and the whole of the yards, where necessary, provided with good flags, truly laid, and jointed with cement. There should be left no relic of the present unwholesome condition of the soil in the rear of houses.

At the same time the passage drains require reconstructing, and the passages themselves need relaying in the same manner as the yards, unless such reconstruction has recently taken place.

The result will, however, be unsatisfactory unless the materials used are of good quality and adapted to circumstances, and unless the fixing is done under the most rigorous supervision.

In the meantime the question is urgent, as we are practically at a standstill in regard to many conditions which are grossly injurious to health.

ON BAKEHOUSES.

In the Annual Reports on the Health of Manchester for 1894 and 1895 will be found statements in reference to bakehouses as they occur in this City. A large proportion of our bakehouses are underground, so that the strictures on this class of bakehouse made by Dr. F. J. Waldo applied to us with peculiar force. It required only very casual examination of many of these places to see that they were quite unfit for the purpose to which they were being applied.

Of deficient height, badly ventilated, badly lighted, dirty, and broken, they were manifestly unsafe as regards the health of the workpeople occupying them, and as regards the condition of the bread produced in them. Not unfrequently street dirt was blown in from the windows or dropped from the shop above. The drainage was defective, or a closet stood in the interior. The ovens being of the waggon type, every time that the waggon was charged or taken out the bakehouse was filled with the fumes of carbonic acid, carbon monoxide, and sulphurous acid. The bakers were frequently locked into the bakehouse all night, exposed to the high temperature and defective atmosphere of the cellar.

When the condition of these bakehouses was first taken in hand in 1894, the Master Bakers' Association was strongly exercised on the subject. But so convinced did they become of the need for action that a resolution was passed at one of their meetings—on December 20th, 1894—affirming the principle that all cellar bakehouses throughout the country should be closed gradually, providing the reasonable interests of the trade were safeguarded. The Association was also of opinion, however, that cellar bakehouses should be closed by an Act of Parliament, on definite principles, and not in an isolated manner.

From this view it is impossible to dissent, though, when translated into practice, it is apt to mean continuing to accept very insanitary arrangements, and accordingly a number of prosecutions were instituted against the occupants of insanitary bakehouses.

Very soon it became necessary to state what alterations to cellar bakehouses would put them into a condition to comply with the requirements of the Factory and Workshops Acts.

However wishful one might be to get rid of cellar bakehouses, it is no light matter to drive things to extremity, when the bulk of the work is being done in cellars.

As a first step, then, certain broad principles were laid down to this effect :—

1. All the surfaces to be made damp proof.

2. The walls and ceiling of the bakehouse, as far as possible (and generally it is possible), to be made smooth and even, so that dirt cannot lodge.

3. The tables, troughs, &c., to be provided with strong swivel castors, so that all parts of the bakehouse can easily be got at to be cleansed.

4. Ample light to be provided in such a manner as to exclude the entrance of dirt.

5. Ventilation to be provided by inlet tubes introducing air from a height of at least six feet above the pavement, with outlet shafts to correspond.

6. The bakehouse not to be left in permanent connection with dirty recesses or storerooms.

At first the baker was required to have his bakehouse altered on these lines by some sanitary engineer, but the arrangement was not found to work altogether well, and often entailed repeated visits on the part of the Medical Officer of Health.

Finally, a skeleton form of specification was drawn up, the particulars for each separate case being inserted, and to the Surveyor attached to the Sanitary Department fell the drawing up of the specification special to each case. This is now done after consultation on the spot with the Medical Officer of Health and, if the work is carried out, no further procedure is adopted.

With one or two exceptions the places reconstituted in accordance with these specifications have become altogether different bakehouses, and the bakers are now highly satisfied with them.

In the Report for 1895 a list is given of the bakehouses closed and repaired respectively up to the writing of that section of the Report.

The following is a corresponding list for the period which has since elapsed, which is a little over a year :—

Closed.

Address.	Date when Reported Closed.
225, Droylsden Road	May 26th, 1897
49, Stockport Road	May 17th, ,,
723, Ashton Old Road	May 17th, ,,
150, Stretford Road	May 17th, ,,
22, Preston Street	June 18th, ,,
28a, Ludlow Street	June 23rd, ,,
160, Thomas Street	June 23rd, ,,
61, Butler Street	June 25th, ,,
115, Moss Lane West	June 28th, ,,
189, Great Ancoats Street	Nov. 4th, ,,
97, Ashton Old Road	Nov. 27th, ,,
113, Upper Brook Street	Jan. 4th, ,,
63, Brunswick Street	Jan. 5th, ,,
46, Bradford Road	Jan. 18th, ,,
48, Stretford Road	July 22nd, 1896
9, Collinge Street	Jan. 13th, 1897
30a, Briar Street	April 22nd, ,,
103, Piccadilly	April 22nd, ,,
100, Medlock Street, Hulme	Sept. 15th, 1896
40, Fernie Street	Nov. 12th, ,,
6, Upper Jackson Street	Nov. 27th, ,,
68a, Rochdale Road	Dec. 23rd, ,,
143, Oldham Street	Dec. 19th, ,,
157, Rochdale Road	July 1st, 1897

Put in Satisfactory Repair.

Situation.	Occupier.	Date when Reported Satisfactory.
94, Cheetham Hill Road	S. Gordon	June 17th, 1897
27, Preston Street	John Mennell	July 1st, ,,
129, Princess Street	Alf. Calligan	May 17th, ,,
161, Princess Street	Ellen Warburton	May 17th, ,,
191, Princess Street	Amelia Wilkinson	May 17th, ,,
60, Shakespeare Street		May 17th, ,,
6, Bentinck Street	C. Frankenburg	Mar. 16th, ,,
77, Piccadilly	J. Wilson	Apl. 26th, ,,
57, Boundary Street	E. Hargreaves	Apl. 26th, ,,

PUT IN SATISFACTORY REPAIR—*continued.*

SITUATION.	OCCUPIER.	DATE WHEN REPORTED SATISFACTORY.
529, Stockport Road	Thomas Cook	May 29th, 1897
3, Worsley Street	Samuel Sherley ...	May 29th, ,,
228, Cheetham Hill Road	Smith and Fitton...	May 29th, ,,
282, Waterloo Road.....	F. Schofield.....	Sept. 11th, 1896
148, Long Millgate	Eli Pressman	Sept. 11th, ,,
3, Nightingale Street	J. Marcovitch	Oct. 17th, ,,
49, Market Street	Mary Darbyshire...	Oct. 19th, ,,
126, Moreton Street.....	Isaac Lipoloskie ...	Oct. 19th, ,,
46, Lord Street	Asher Baum	Oct. 19th, ,,
11, Lord Street	Eli Morris	Oct. 19th, ,,
76, Berkeley Street.....	H. Glaskie.....	Nov. 4th, ,,
104, Ashley Lane	R. Sidebottom.....	Nov. 12th, ,,
2a, Scotland	J. Rafkovitch	Dec. 31st, ,,
51, Bury New Road	R. Manley	Dec. 31st, ,,
Vine Street, Openshaw.....	Jas. Holland.....	Feb. 5th, 1897
152, Rochdale Road, Harpurhey	Mrs. Baker	Feb. 17th, ,,

REPORT BY MR. A. T. ROOK, SUPERINTENDENT OF THE SANITARY DEPARTMENT.

Sanitary Department,
Town Hall, Manchester,
June, 1897.

In presenting to the Medical Officer of Health the report of the work transacted in the Sanitary Department for the year ending 30th April, 1896, I beg to state that the City, for inspection and other purposes, is divided into 28 districts, to each of which one Sanitary Inspector has been assigned.

In addition to these, there are also four Smoke, two Canal Boats and Lodging-house, two Adulteration of Food, and six Factory and Workshops Inspectors.

The number of complaints of nuisances of various kinds made during the year was 52,961, viz.:—

3,687 through the Medical Officer of Health's Department.
1,792 by the Public
3,963 through the Police
43,519 by the Staff.

The number of inspections and re-inspections was as follows* :—

46,270	Dwelling-houses
3,334	Inspections and
9,562	Re-inspections of infected dwelling-houses.
641	Factories and Workshops
532	Cellars
315	Offensive trades
136	Slaughter-houses
427	Schools
1,839	Mills
307	Tips
29,984	Miscellaneous.

In 1,335 houses and premises smoke or water tests have been applied to the drains for the purpose of discovering defects.

For the abatement of nuisances of various kinds, 14,930 notices were served, viz. :—

To abate overcrowding	215
To cleanse and limewash houses	796
To cleanse privies	88
To cleanse bakehouses	1
To cleanse workshops	439
To discontinue nuisances arising from black smoke being emitted from chimneys	169
To repair, &c., house drains	3,486
To register houses occupied by lodgers	386
To remove offensive deposits, stagnant water, &c.	798
To abate nuisances arising from animals kept in a filthy state, or to remove such animals...	137
To repair, renew, or provide privies, ashpits, or water-closets...	1,790
To repair yards and passages	1,042
To repair dilapidated houses	2,642
To cleanse and disinfect dilapidated houses	2,439
To provide urinals to public and beer houses	56
To close houses in a dilapidated, &c., condition and consequently unfit for human habitation	166
To place bakehouses in a proper sanitary condition	17
To place workshops in a proper sanitary condition	147
To close workshops unfit for use on sanitary grounds	37

35,091 re-inspections have been made after notices to ascertain if the work had been done.

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* See also table for the year ending December 31st, 1896 (page 178), relating to nuisances.

HOUSES LET IN LODGINGS.

Under the powers given by section 90 of the Public Health Act, the bye-laws made thereunder have been strictly enforced.

The number of houses on the register is 1,442.

To these, 1,608 day visits and 445 night visits have been paid.

36 infringements of the regulations have been reported and dealt with.

215 night visits have also been paid to unregistered houses, the occupiers having previously denied that lodgers were kept.

DAIRIES, MILKSHOPS, AND COWSHEDS REGULATIONS.

Under this Order, which was made in July, 1879, 2,469 milkshops and dairies and 123 cowkeepers are now on the register. The number of cows kept is 1,553. The number of visits to dairies, milkshops, and cowsheds was 2,249.

It may be stated that many of the dairies and cowsheds are not in a very satisfactory condition, and great reluctance has been shown in the past, in consequence of the very serious structural alterations required, especially in cowsheds, to enforce the alterations necessary to bring them up to the present state of sanitary requirements. The new regulations, it is hoped, will enable the Inspectors to deal more effectually with insanitary cow-sheds, &c.

WORKSHOPS, BAKEHOUSES, AND SHOP HOURS ACTS.

Four male and two female Inspectors are appointed to carry out these Acts. The female Inspectors confine their attention to workshops where females are employed, to shops where young persons are employed, and to visiting shops where outworkers are employed. In respect of the latter, a list of outworkers is kept, and visits are paid to the houses in which the work is being done.

The City, for inspection purposes, is divided into four districts—the two female Inspectors visiting any of the districts as required.

The inspections by these Officers have already resulted in a marked improvement in the condition of the workshops and bakehouses, and the figures hereafter given do not at all represent the actual work done, as many of the occupiers have, at the request of the Inspectors, without notice, made alterations for improving the ventilation, lighting, and cleansing, &c.

As regards the Shop Hours Act, there is every reason to believe that, with few exceptions, the Act is now being fairly well observed.

The work done by these Officers under the above Acts is shown by the following tables.

WORK DONE BY THE INSPECTORS UNDER THE ACTS FROM THE 19TH SEPTEMBER, 1895, TO 23RD SEPTEMBER, 1896, INCLUSIVE.

Number of District	INSPECTOR	SHOPS						WORKSHOPS									BAKEHOUSES					
		Number of visits	Number reported for offences against the Act	Number of copies of Abstract distributed	Number registered during the year	Number struck off register during the year	Total number on register	Number of visits	Number of Lists of Outworkers, &c., distributed	Number of Sanitary Defects reported	Number of reports sent to Factory Inspector	Number registered during the year	Number struck off register during the year	Total number on register	Number of visits to houses where outworkers are employed	Factories and Workshops not provided with proper means of escape in case of fire	Number of visits	Number of Sanitary Defects reported	Number of reports sent to Factory Inspector	Number registered during the year	Number struck off register during the year	Total number on register
1	Edward E. Roberts	32	...	...	...	...	551	2761	14	446	205	280	263	976	3	10	463	75	...	2	2	72
2	John Kewley	17	...	...	...	...	709	3026	1	195	130	352	376	1113	...	36	775	68	7	16	3	144
3	George S. Spencer..	67	...	17	17	2	616	2729	1	166	157	253	98	1171	6	27	581	108	3	29	4	123
4	Francis J. Rowe ...	15	6	3	2	1	755	2884	2	174	132	255	360	1153	2	43	842	...	4	11	11	102
...	Emma Coppock ...	2211	4	186	181	63	...	1985	79	88	54	...	28	...	626	...	1	...	1	...	...	...
...	Alice Tattersall ...	1968	7	159	157	54	...	1302	30	25	54	1	46	...	1426	...	...	...	...	...	...	...
...	TOTALS.....	4310	17 *	365	357	120	2631	14687	127	1094 †	732	1141	1171	4413	2063	116 ‡	2662	359 §	15	58	20	441

* In the whole of the 17 cases reported for infringements of the Shop Hours Act, the persons are now complying with the Act.

† Of the 1,094 defects in Factories and Workshops, 92 of the cases have been referred to the City Surveyor to prepare plans for improved closet accommodation, in 54 of which cases the necessary accommodation has been provided; 989 have been remedied, and 13 not remedied, but notices have been served to make good the defects.

‡ 116 Factories and Workshops have been reported as not being provided on the storeys above the ground floor with such means of escape in case of fire for the persons employed therein as can reasonably be required under the circumstances of each case—64 notices have been served to make the necessary provision, 26 of which have been complied with, and 52 cases referred to the City Surveyor for report thereon.

§ Of the 359 defects in Bakehouses, 279 have been remedied, 9 Bakehouses closed, and 71 not remedied (in 17 of these cases the Medical Officer of Health reported the premises to be unfit for use on sanitary grounds, and the Sub-Committee referred them to the Town Clerk to take legal proceedings against the occupiers, 3 notices have been served, and 51 occupiers have promised to make good the defects).

Prosecutions for Offences, with Results.

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed			Amount of Costs ordered to be Paid		
			£	s.	d.	£	s.	d.
Michael McCarthy..	60, Garside Street, Bridge Street.....	Employing a young person over 74 hours per week	0	5	0	0	8	6
Ditto ...	Ditto	Ditto ditto ...	0	5	0	0	8	6
Alfred Wm. Painter..	56, Every Street, Ancoats	Ditto ditto ...	1	0	0	0	8	6
Arthur Roddy	198, Rochdale Road	Ditto ditto ...	1	0	0	0	8	6
Robert Rosling.....	37, Stretford Road	Not exhibiting Abstract of Act in a conspicuous position in his shop	0	2	6	0	2	6
Charles W. Simpson.	18, Cavendish Street	Ditto ditto ...	0	10	0	0	8	6
George Arthur Dunn	19, Piccadilly	Ditto ditto ...	0	5	0	0	5	0
Alex. Jack Brown...	27, Market Street.....	Not keeping a list showing the names and addresses of persons employed by him as outworkers	0	10	0	0	8	6
Abraham Lazarus...	8, Saint Mary's Street	Neglecting to cleanse, &c., workshop after notice		.....		0	3	0
Joseph Isaacs	22, Fernie Street, Red Bank	Ditto ditto ...	0	10	0	0	8	6
Hannah Treger.....	7, Style Street	Ditto ditto ...	0	5	0	0	5	0
Levy and Irgang ...	92, Great Ducie Street.....	Ditto ditto ...	1	0	0	0	17	0
Peter Clayman	Ditto	Ditto ditto ...	0	10	0	0	8	6
Shine and Daniels...	Ditto	Ditto ditto ...	0	10	0	0	8	6
Joseph Abrahams...	Ditto	Ditto ditto ...	0	10	0	0	8	6
Boulton and Manyon	4, Newton Street	Neglecting to cleanse and purify closet of workshop after notice	1	0	0	0	17	0
John Beeston	67, Piccadilly	Ditto ditto ...	0	10	0	0	8	6
		Carried forward.....£	8	12	6	7	3	0

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed	Amount of Costs ordered to be Paid
			£ s. d.	£ s. d.
		Brought forward.....	8 12 6	7 3 0
Joseph Sorrm	29a, Bury New Road	Neglecting to cleanse, &c., his workshop after notice	0 5 0	0 5 0
John Kilbeg	14, Ardwick Green	Ditto ditto	Withdrawn	(work done)
Willliam Stockton...	42, Henry Street	Ditto ditto	Pending	
Saul Stern	70, Hanover Street	Ditto ditto		
J. Satterfield & Co. Limited	9, Saint Ann's Square	Neglecting to abate overcrowding of workshop after notice	.....	0 3 0
John Rigby	73, West Dixon Street, Salford	Neglecting to place the workshop No. 93 and 95, Great Ducie Street in a proper sanitary condition after notice...	.....	0 3 0
Morris Davidson ...	45, Cheetham Hill Road.....	Neglecting to efficiently ventilate his workshop after notice	.....	0 3 0
Richard Newton ...	2, Tin Street	Neglecting to place the workshop No. 20, Zinc Street in a sanitary condition after notice	.....	0 3 0
Jas. Doherty & Co. Limited	Nelson Street, Rochdale Road	Neglecting to remove manure from adjoining their workshop after notice ...		
Thomas Appleby ...	16a, Gibbon Street	Neglecting to place closet of workshop in a sanitary condition after notice ...	Withdrawn	(work done)
John Charlton	Agent to Salvation Army.....	Ditto (workshop 16a, Gibbon Street)		
		Carried forward.....	8 17 6	8 0 0

PROSECUTIONS FOR OFFENCES, WITH RESULTS—*continued.*

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed	Amount of Costs ordered to be Paid
			£ s. d.	£ s. d.
		Brought forward.....	8 17 6	8 0 0
William Robert Coe.	88, Mosley Street	Neglecting to comply with a notice to provide satisfactory means of escape in case of fire at factory situate 40–42, Cannon Street	Withdrawn	(work done)
Samuel Levy.....	64, Cheetham Hill Road	Having his bakehouse in a dirty condition	0 5 0	0 5 0
Meyer Solomon ...	41, Lord Street.....	Ditto ditto ...	0 10 0	0 8 6
Thomas Brownhill..	117, Brunswick Street, Chorlton-upon-Medlock	Ditto ditto ...	0 2 6	0 2 6
John Thompson ...	66a, Back Grafton Street, Chorlton-upon-Medlock	Ditto ditto	Pending	
Jacob Kafkervitch...	2a, Scotland, Red Bank	Ditto ditto		
Louis Cohen	38–40, Fernie Street.....	Ditto ditto ...	0 5 0	0 5 0
Eli Morris	11, Lord Street.....	Ditto ditto ...	0 10 0	0 8 6
Jas. P. Wainwright..	143, Oldham Street	Occupying premises certified by the Medical Officer of Health to be unfit for use on Sanitary grounds.....	Withdrawn	(removed)
Jacob Earnshaw ...	South King Street	Neglecting to provide satisfactory closet accommodation to workshop, 26, Cotton Street, after notice	Withdrawn	(work done)
John Wainwright ...	87, Market Street	Ditto 23, China Lane		
		Carried forward .....£	10 10 0	9 9 6

PROSECUTIONS FOR OFFENCES, WITH RESULTS—*continued.*

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed	Amount of Costs ordered to be Paid
			£ s. d.	£ s. d.
		Brought forward.....	10 10 0	9 9 6
Thomas Lees.....	26, Victoria Street	Neglecting to provide satisfactory closet accommodation to workshop, 107a, Upper Moss Lane, after notice	Withdrawn	(work done)
Robert Neill & others	Strangeways	Ditto 5, Nightingale Street ...		
John Marriott	Norfolk Street	Ditto 47 and 49, Lever Street		
Geo. Wadsworth ...	Albert Square	Neglecting to provide satisfactory closet accommodation to workshop, 51a, Grosvenor Street	5 0 0	0 8 6
John Beisty	Rochdale Road.....	Ditto Pilling Street		
Jas. Hy. Gibbons ...	John Dalton Street	Ditto 17, Cannell Street		
N. Spencer, Piggott, & Co.	High Street	Ditto 46, Church Street		
George Benson	8, York Street, City	Ditto 34a, George Street, City		
Joseph Bradbury ...	Brook Street, Chorlton-upon-Medlock...	Ditto 175, Princess Street ...		
John Andrews	.....	Ditto 242, Oldham Road, N.H.	Withdrawn	(work done)
William Griffin	17, Thomas Street	Ditto Behind 6, Park Street...		
Thomas Carr.....	.....	Ditto 129, Stockport Road ...		
Joseph Lawson	17, Brazennose Street	Ditto 54, Mulberry Street ...		
Wm. Hy. Robinson.	Bridge Street.....	Ditto 137a, Princess Street...		
John Hy. Gibbons...	John Dalton Street	Ditto 37 and 39, Milton Street		
John B. Midgley ...	1, Cooper Street	Ditto 3b, York Street, C.-on-M.		
		Carried forward .....£	15 10 0	9 18 0

PROSECUTIONS FOR OFFENCES, WITH RESULTS—*continued.*

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed	Amount of Costs ordered to be Paid
			£ s. d.	£ s. d.
		Brought forward.....	15 10 0	9 18 0
Edgar Samuel	87, Market Street	Neglecting to comply with notice to provide satisfactory closet accommodation at— 87, Market St. (top floor)	Pending	
Robert C. Stonex ...	Blackfriars Street	Ditto 200 and 202, City Road		
Wm. W. Tomlins ...	4, St. Ann's Square	Ditto 2, Brook Street, C.-on-M.		
Ditto	Ditto	Ditto 12a and 12b, Brook St.		
Joseph Hilton	Market Street	Ditto 20, Charles Street		
Saml. Wainwright ...	Harpurhey.....	Ditto Plympton Street.....		
David Mounsey ...	8, York Street	Ditto 177, City Road	Withdrawn	(work done)
John Cunnah	Alexandra Road	Ditto 12, Mitford Street, Harpurhey		
Fredk. Spafford.....	St. James's Square	Ditto 2, Commercial Street...		
Wm. Hy. Sutton ...	59, Oldham Road.....	Ditto Glasshouse Street		
		Total.....£	15 10 0	9 18 0

SMOKE NUISANCES.

For the abatement of smoke nuisances, the four Inspectors appointed specially for this work have taken 1,454 timed observations of half-an-hour each, with the result that 169 notices for the abatement of nuisances have been served. In addition to which, proceedings before the magistrates have been ordered in 127 cases out of 187 offences reported. These cases were disposed of as follows :—

126 were summoned before the Justices, in 88 of which fines were imposed amounting to £208 15s. 8d., and costs £38 13s.

4 were ordered to pay costs only.

30 orders of abatement were granted and served, 1 case was adjourned, and 3 cases were excused, dismissed, or withdrawn.

Much attention during the past year, as will be seen by the above, has been given to the nuisance caused by the emission of black smoke, not only from the furnaces connected with boilers in mills, warehouses, and other works, but also from chemical and other industries, and the efforts made have already resulted in a considerable reduction of the nuisance. It is hoped that the proceedings now pending against certain grave offenders will have a further beneficial effect.

FOOD AND DRUGS ACTS AND MARGARINE ACT.

Under these Acts, the two Inpectors specially appointed have purchased for analysis 1,662 samples. Of these, 76 only were adulterated, viz. :—

Butter	25
Drugs	3
Milk	44
Mustard	1
Spirits	3

72 summonses were issued. In 49 cases fines were imposed amounting in the aggregate to £104 13s. 6d., and the costs £81 1s.

17 summonses were dismissed or withdrawn.

3 warrants were granted.

3 were ordered to pay costs only.

CANAL BOATS ACTS.

The number of canal boats on the register is 561.

The number inspected was 2,003, resulting in 5 infringements of the Act being discovered, which were referred to the Justices to be dealt with: in each case fines were imposed amounting in the aggregate to 12s. 6d., and the costs £1 17s. 6d.

166 caution notices were sent to the owners and masters.

OFFENSIVE TRADES.

The number of offensive trades on the register is 270. These have been placed under close supervision, and periodical visits paid.

UNHEALTHY DWELLINGS.

During the year, 493 houses were certified to be dealt with by the Sanitary Committee.

481 of these were ordered to be closed.

A large proportion of these houses have since had structural alterations made to them which satisfied the requirements of the Medical Officer of Health, and have since been allowed to be reinhabited.

CLOSET ACCOMMODATION TO WORKSHOPS, WAREHOUSES, &c.

129 properties were reported as being deficient in closet accommodation.

In a large number of cases the necessary accommodation has been provided, and in others orders have been made to provide the necessary accommodation, or the reports are under consideration.

Again I am unable to conclude this report without calling attention to the very serious danger to health arising from the present pail-closet and midden systems. During the last twelve months many owners of property have recognised the necessity of a change, and have substituted water-closets for pail or midden closets, and where the change has taken place great satisfaction has resulted.

TABLES.

TABLE A.—MANCHESTER, 1896.

CAUSES OF DEATH AT DIFFERENT LIFE PERIODS IN THE 53 WEEKS OF THE YEAR.

PERSONS.—(MALES AND FEMALES.)

CAUSES OF DEATH	Ages at Death													
	All Ages	Under 5 Years		5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
		0 to 1	1 to 5											
All Causes	11874	3115	2028	303	157	258	267	701	1051	1189	1218	1034	481	72
I. Zymotic Diseases	2,083	795	930	103	17	32	31	60	35	24	32	18	6	...
II. Parasitic Diseases	8	8	...	...	...	...	...	...	...	..	...	...	...	...
III. Dietetic Diseases	60	...	...	...	...	...	1	9	22	19	9	...	...	...
IV. Constitutional Dis:	2,006	173	205	52	49	102	101	284	373	314	219	111	22	1
V. Developmental Dis:	648	397	2	...	...	...	...	...	...	2	19	74	127	27
VI. Local Diseases	5,778	1045	760	119	79	109	120	308	555	737	873	757	279	37
VII. Violence	383	85	62	27	10	14	12	26	41	43	27	18	15	3
VIII. Ill-defined Causes	908	612	69	2	2	1	2	14	25	50	39	56	32	4
I.—Zymotic Diseases.														
1. Miasmatic Diseases.														
Smallpox.. Vaccinated	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Smallpox.. Unvaccinated	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Smallpox.. No Statement	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Chickenpox	2	1	1	...	...	...	...	...	...	...	...	...	...	...
Measles	567	137	406	21	2	...	...	1	...	...	...	...	...	...
Epidemic Rose Rash	1	1	...	...	...	...	...	...	...	...	...	...	...	...
Scarlet Fever..	198	5	129	46	7	5	2	4	...	...	...	...	...	...
Typhus	1	...	...	1	...	...	...	...	...	...	...	...	...	...
Relapsing Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Influenza	53	2	4	...	1	1	3	8	6	6	15	7	...	...
Whooping Cough	359	135	207	17	...	...	...	...	...	...	...	...	...	...
Mumps	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Diphtheria	54	3	42	5	...	3	...	...	1	...	...	...	...	...
Membranous Croup	29	2	24	3	...	...	...	...	...	...	...	...	...	...
Cerebro-spinal Fever	1	...	...	...	...	...	...	...	1	...	...	...	...	...
Simple and Ill-defined Fever	4	1	3	...	...	...	...	...	...	...	...	...	...	...
Enteric Fever	118	1	8	7	3	21	19	31	14	10	4	...	...	...
Other Miasmatic Diseases	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2. Diarrhœal Diseases.														
Simple Cholera	12	11	1	...	...	...	...	...	...	...	...	...	...	...
Diarrhœa, Dysentery	560	427	98	3	1	...	1	3	2	2	9	9	5	...
3. Malarial Diseases.														
Remittent Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ague	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4. Zoogenous Diseases.														
Hydrophobia	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Glanders	1	...	...	...	...	...	...	...	...	...	1	...	...	...
Splenic Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cowpox and other effects of Vac:	1	...	1	...	...	...	...	...	...	...	...	...	...	...
5. Venereal Diseases.														
Syphilis	67	62	2	...	...	...	1	...	2	...	...	...	...	...
Gonorrhœa, Stricture of Urethra	7	...	...	...	...	...	...	3	2	2	...	...	...	...
6. Septic Diseases.														
Phagedæna	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Erysipelas	17	5	3	...	...	...	...	...	3	1	2	2	1	...
Pyæmia, Septicæmia	14	2	1	...	3	1	...	2	1	3	1	...	...	...
Puerperal Fever	17	...	...	...	...	1	5	8	3	...	...	...	...	...
II.—Parasitic Diseases.														
Thrush	8	8	...	...	...	...	...	...	...	...	...	...	...	...
Other Dis: from Veg: Parasites	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hydatid Disease	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other Dis: from Animal Par:	..	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE A, 1896—*continued.*

CAUSES OF DEATH	Ages at Death													
	All Ages	Under 5 Years		5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
		0 to 1	1 to 5											
III.—Dietetic Diseases.														
Starvation, Want of Breast Milk	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Scurvy	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Intem: Chronic Alcoholism	51	...	...	...	...	...	1	9	17	17	7	...	...	...
Intem: Delirium Tremens	9	...	...	...	...	...	...	...	5	2	2	...	...	...
IV.—Constitutional Diseases.														
Rheum: Fev: Rheum: of Heart	31	...	...	2	3	7	2	6	5	4	2	...	...	...
Rheumatism	32	...	...	1	...	...	3	...	...	4	10	11	3	...
Gout	7	...	...	...	...	...	...	...	1	2	2	1	1	...
Rickets	32	12	19	1	...	...	...	...	...	...	...	...	...	...
Cancer	358	...	2	...	...	3	2	10	49	94	122	60	15	1
Tabes Mesenterica	69	34	30	4	1	...	...	...	...	...	...	...	...	...
Tuberc: Mening: (Hydroceph:)	131	38	65	13	8	3	...	3	1	...	...	...	...	...
Phthisis	1,078	7	26	14	23	81	83	248	298	197	67	32	2	...
Other forms of Tuberc: Scrofula	196	79	58	13	11	5	7	7	8	3	4	1	...	...
Purpura, Hæmorrhagic Diathesis	2	...	...	1	...	...	...	...	...	...	1	...	...	...
Anæmia, Chlorosis, Leucocy : .	27	2	5	1	...	2	3	3	4	1	5	1	...	...
Diabetes Mellitus	40	1	...	2	3	1	1	6	6	8	6	5	1	...
Other Constitutional Diseases...	3	...	...	...	...	...	...	1	1	1	...	...	...	...
V.—Developmental Diseases.														
Premature Birth	326	326	...	...	...	...	...	...	...	...	...	...	...	...
Atelectasis	11	11	...	...	...	...	...	...	...	...	...	...	...	...
Cyanosis	23	23	...	...	...	...	...	...	...	...	...	...	...	...
Spina Bifida	9	9	...	...	...	...	...	...	...	...	...	...	...	...
Imperforate Anus	5	4	1	...	...	...	...	...	...	...	...	...	...	...
Cleft Palate Harelip	9	9	...	...	...	...	...	...	...	...	...	...	...	...
Other Congenital Defects	16	15	1	...	...	...	...	...	...	...	...	...	...	...
Old Age	249	...	...	...	...	...	...	...	...	2	19	74	127	27
VI.—Local Diseases.														
1.-Nervous System(Dis: of).														
Inflam: of Brain or its Mem:	173	61	71	16	7	3	4	5	1	2	3	...	...	...
Apoplexy	267	2	...	1	1	1	2	7	19	62	67	72	29	4
Softening of the Brain	47	...	...	...	...	...	...	1	3	4	9	25	5	...
Hemiplegia, Brain Paralysis	125	...	1	1	...	1	1	1	8	20	38	40	13	1
Paralysis Agitans	4	...	...	...	...	...	...	...	...	...	2	1	1	...
Insanity, Gen: Par: of Insane	122	...	...	...	...	3	4	16	23	22	16	19	17	2
Chorea	1	...	...	...	1	...	...	...	...	...	...	...	...	...
Epilepsy	25	...	1	...	4	2	1	5	6	1	3	2	...	...
Convulsions	235	186	41	7	1	...	...	...	...	...	...	...	...	...
Laryngismus Stridulus	15	12	1	1	...	...	...	...	...	1	...	...	...	...
Idiopathic Tetanus	2	2	...	...	...	...	...	...	...	...	...	...	...	...
Paraplegia, Dis: of Spinal Cord	24	...	...	...	...	...	2	6	3	5	5	3	...	...
Other Diseases of Nervous Sys:	51	9	6	4	2	3	1	4	8	5	7	1	1	...
2. Organs of Special Sense (Diseases of).														
Otitis, Otorrhœa	25	5	9	2	3	1	1	2	...	...	2	...	...	...
Epistaxis and Disease of Nose	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ophthalmia and Disease of Eye.	1	...	...	...	...	...	...	...	...	...	...	1	...	...
3. Circulatory Sys: (Dis: of)														
Endocarditis	28	...	1	2	1	2	3	6	7	2	3	1	...	...
Valvular Disease	184	...	...	3	9	12	13	17	32	44	28	20	5	1
Pericarditis	10	...	...	...	...	1	3	1	3	...	...	2	...	...
Hypertrophy of Heart	2	...	...	...	...	...	...	...	...	...	...	2	...	...
Angina Pectoris	8	...	...	...	...	...	...	...	1	3	2	2	...	...
Syncope	57	5	...	1	...	...	1	1	6	5	8	14	13	3

TABLE A, 1896—*continued.*

CAUSES OF DEATH	Ages at Death													
	All Ages	Under 5 Years		5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
		0 to 1	1 to 5											
3. Circulatory Sys: (Dis: of) *(continued)*														
Aneurism	16	...	...	...	...	1	...	1	5	3	3	3	...	...
Senile Gangrene	16	...	...	...	...	...	...	...	...	...	3	7	5	1
Embolism, Thrombosis	34	...	1	...	...	1	1	3	5	7	6	2	8	...
Phlebitis	4	...	...	...	...	...	1	1	1	1	...	...	...	...
Varicose Veins	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other Dis : of Circulatory Sys :	584	2	1	3	8	11	7	28	81	128	149	123	36	7
4. Respiratory Sys: (Dis: of)														
Laryngitis	26	4	11	6	1	1	...	1	1	...	1	...	...	...
Croup	15	5	9	1	...	...	...	...	...	...	...	...	...	...
OtherDis:ofLarynxandTrachea	2	...	...	...	...	...	...	1	1	...	...	...	...	...
Emphysema, Asthma	13	...	...	...	...	...	...	1	2	6	2	2	...	...
Bronchitis	1,246	290	150	9	3	4	7	24	58	120	247	231	90	13
Pneumonia	1,384	264	352	39	14	32	37	95	165	163	122	72	25	4
Pleurisy	50	...	3	1	4	4	2	7	7	7	6	7	2	...
Other Dis: of Resp: System	68	17	11	...	...	2	...	2	1	7	11	8	8	1
5. Digestive Sys: (Dis: of).														
Stomatitis	10	10	...	...	..	...	...	...	...	...	...	...	...	...
Dentition	62	29	33	...	...	...	...	...	...	...	...	...	...	...
Sore-throat, Quinsy	1	...	...	...	...	...	...	1	...	...	...	...	...	...
Dyspepsia	12	8	1	...	...	...	...	...	...	...	3	...	...	...
Hæmatemesis	3	...	...	...	...	...	...	...	2	1	...	...	...	...
Melæna	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Diseases of Stomach	82	31	6	1	1	2	3	4	7	7	9	7	4	...
Enteritis	107	66	10	3	...	2	1	3	2	4	7	7	2	...
Ulceration of Intestine	6	1	...	...	...	...	1	...	2	...	2	...	...	...
Ileus, Obstruction of Intestine..	41	2	2	2	3	1	2	...	4	6	10	9	...	...
Strict: or Strang: of Intestine...	1	...	...	...	...	...	...	...	1	...	...	...	...	...
Intussusception of Intestine	2	...	1	...	...	...	1	...	...	...	...	...	...	...
Hernia	18	...	...	...	...	...	...	1	3	5	3	5	1	...
Fistula	1	...	1	...	...	...	...	...	...	...	...	...	...	...
Peritonitis	54	4	5	4	8	7	5	8	4	4	3	1	1	...
Ascites	4	...	1	1	...	...	...	...	...	...	...	2	...	...
Gallstones	4	...	...	...	...	...	...	...	...	1	2	1	...	...
Cirrhosis of Liver	59	...	...	...	...	...	...	6	9	21	19	4	...	...
Other Diseases of Liver	58	13	3	1	...	...	...	5	6	7	12	10	1	...
Other Dis: of Digestive System	34	8	10	1	...	3	...	3	3	1	3	1	1	...
6. Lymph: Sys: and Ductless Glands (Dis: of).														
Diseases of Lymphatic System.	5	...	2	...	...	1	...	1	...	...	1	...	...	...
Diseases of Spleen	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Bronchocele	1	...	...	...	...	...	...	...	1	...	...	...	...	...
Addison's Disease	2	...	...	...	1	...	...	...	1	...	...	...	...	...
7. Urinary System (Dis: of).														
Acute Nephritis	53	2	12	3	...	1	1	4	7	9	10	4	...	...
Bright's Disease	128	...	1	3	2	...	5	9	27	33	26	19	3	...
Uræmia	11	...	...	...	...	...	...	2	1	2	3	3	...	...
Suppression of Urine	1	...	...	...	...	...	...	...	...	...	1	...	...	...
Calculus	2	...	...	...	...	1	...	...	...	1	...	...	...	...
Hæmaturia	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Dis: of Bladder and Prostate	36	...	...	...	1	...	2	2	1	...	5	19	6	...
Other Dis: of Urinary System..	16	...	...	...	...	...	1	...	1	7	5	1	1	...
8. Reproductive System (Diseases of).														
(a) Generative Organs (Dis: of):														
Ovarian Disease	8	...	...	...	...	...	1	2	3	2	...	...	...	...
Diseases of Uterus and Vagina.	7	...	...	...	..	...	...	3	2	...	1	...	1	...
Disorders of Menstruation	1	...	...	...	1	...	...	...	...	...	...	...	...	...

TABLE A, 1896—*concluded.*

CAUSES OF DEATH	Ages at Death													
	All Ages	Under 5 Years		5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
		0 to 1	1 to 5											
8. Reproductive System (Dis: of)—*continued.*														
Pelvic Abscess	7	...	1	...	...	...	1	2	2	1	...	...	...	...
Perineal Abscess	1	...	...	...	...	...	...	...	...	...	1	...	...	...
Dis: of Testes, Penis, Scrotum, &c.	7	...	2	...	...	...	...	3	1	...	1	...	...	...
(b) Parturition, Disease of:														
Abortion, Miscarriage	3	...	...	...	...	...	...	1	2	...	...	...	...	...
Puerperal Mania	1	...	...	...	...	...	...	...	1	...	...	...	...	...
Puerperal Convulsions	1	...	...	...	...	1	...	...	...	...	...	...	...	...
Placenta Prævia, Flooding	13	...	...	...	...	1	2	6	4	...	...	...	...	...
Phlegmasia Dolens	2	...	...	...	...	...	...	1	1	...	...	...	...	...
Other Accidents of Childbirth	6	...	...	...	...	...	1	1	4	...	...	...	...	...
9. Locomotor Sys: (Dis: of).														
Caries, Necrosis	14	...	...	3	3	2	2	2	2	...	...	...	...	...
Arthritis, Ostitis, Periostitis	4	...	...	...	...	1	...	1	1	1	...	...	...	...
Other Dis: of Locom: Sys:	2	...	...	...	...	...	...	...	...	2	...	...	...	...
10. Integumentary System (Diseases of).														
Carbuncle	5	...	...	...	...	...	...	...	...	2	...	3	...	...
Phlegmon, Cellulitis	3	...	...	...	...	1	...	...	1	...	1	...	...	...
Lupus	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ulcer, Bedsore	7	...	...	...	...	...	...	...	2	2	2	1	...	...
Eczema	1	1	...	...	...	...	...	...	...	...	...	...	...	...
Pemphigus	1	...	...	...	...	...	...	1	...	...	...	...	...	...
Other Dis: of Integ: Sys:	6	6	...	...	...	...	...	...	...	...	...	...	...	...
VII.—Violence.														
1. Accident or Negligence.														
Fractures, Contusions	123	1	14	7	3	10	6	9	12	23	11	10	14	3
Gunshot Wounds	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Cut, Stab	1	..	...	...	...	1	...	...	...	...	...	...	...	...
Burn, Scald	72	1	40	15	3	1	...	1	2	1	3	4	1	...
Poison	10	1	2	...	1	...	...	1	1	3	...	1	...	...
Drowning	23	...	3	5	2	...	1	2	5	3	1	1	...	...
Suffocation	88	80	2	...	...	...	1	2	2	...	1	...	...	...
Otherwise	9	1	1	...	1	...	...	1	1	1	2	1	...	...
2. Homicide.														
Murder, Manslaughter	3	1	...	...	...	...	...	1	1	...	...	...	...	...
3. Suicide.														
Gunshot Wounds	1	...	...	...	...	...	...	...	...	1	...	...	...	...
Cut, Stab	9	...	...	...	...	...	...	...	5	1	2	1	...	...
Poison	25	...	...	...	...	1	3	5	6	6	4	...	...	...
Drowning	5	...	...	...	...	1	1	...	2	1	...	...	...	...
Hanging	11	...	...	...	...	...	...	1	4	3	3	...	...	...
Otherwise	2	...	...	...	...	...	...	2	...	...	...	...	...	...
4. Execution:—Hanging.	1	...	...	...	...	...	...	1	...	...	...	...	...	...
VIII.—Ill-defined and not Specified Causes.														
Dropsy	2	...	...	...	...	...	...	...	...	...	...	1	1	...
Debility, Atrophy, Inanition	610	524	40	2	...	...	1	...	...	2	6	17	16	2
Mortification	5	...	...	...	...	...	...	...	...	2	1	1	1	...
Tumour	4	...	...	...	...	...	...	...	1	...	1	2	...	...
Abscess	1	...	...	..	...	...	...	...	...	1	...	...	...	...
Hæmorrhage	...	...	...	...	...	...	...	...	...	...	..	...	...	...
Sudden (cause unascertained)	172	52	24	...	2	...	...	7	17	29	16	19	6	...
Other Ill-def: not spec: causes.	114	36	5	...	...	1	1	7	7	16	15	16	8	2

TABLE B.

1896.—Summary of Table A, compared with Average Deaths in Groups of Diseases, 1891–95.

	Deaths	
	1896	Average 1891-95
I.—Specific Febrile, or Zymotic Diseases:		
1. Miasmatic Diseases	1,387	1,250
2. Diarrhœal ,,	572	617
3. Malarial ,,	...	...
4. Zoogenous ,,	2	2
5. Venereal ,,	74	74
6. Septic ,,	48	91
II.—Parasitic Diseases	8	6
III.—Dietetic Diseases	60	65
IV.—Constitutional Diseases	2,006	2,071
V.—Developmental Diseases	648	623
VI.—Local Diseases:		
1. Diseases of Nervous System	1,091	1,294
2. Diseases of Organs of Special Sense	26	19
3. Diseases of Circulatory System	943	908
4. Diseases of Respiratory System	2,804	2,878
5. Diseases of Digestive System	559	556
6. Diseases of Lymphatic System and Ductless Glands	8	12
7. Diseases of Urinary System	247	267
8. Diseases of Reproductive System:		
(a) Diseases of Generative Organs...	31	28
(b) Diseases of Parturition	26	59
9. Diseases of Locomotor System	20	44
10. Diseases of Integumentary System	23	24
VII.—Violence:		
1. Accident or Negligence	326	356
2. Homicide	3	7
3. Suicide	53	37
4. Execution:—Hanging	1	...
VIII.—Ill-defined and not Specified Causes	908	896
Total	11,874	12,185

TABLE C.—MANCHESTER, 1896.

Causes of Deaths at different Life Periods—MALES.

Classes	CAUSES OF DEATH	All Ages Total	Ages at Death—in years: Under 5 Years 0 to 1	Under 5 Years 1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
	All Causes	6190	1703	968	154	78	149	147	385	625	696	617	459	186	23
I.	Smallpox	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Measles	262	65	185	11	1	...	...	...	...	...	...	...	...	...
	Scarlet Fever	105	3	69	24	3	4	...	2	...	...	...	...	...	...
	Typhus Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Whooping Cough	158	62	91	5	...	...	...	...	...	...	...	...	...	...
	Diphtheria	29	3	20	4	...	1	...	...	1	...	...	...	...	...
	Membranous Croup	12	1	10	1	...	...	...	...	...	...	...	...	...	...
	Ill-defined Fever	3	1	2	...	...	...	...	...	...	...	...	...	...	...
	Enteric Fever	79	1	2	5	1	15	12	23	9	9	2	...	...	...
	Influenza	28	2	2	...	...	1	3	2	3	4	8	3	...	...
	Simple Cholera	4	4	...	...	...	...	...	...	...	...	...	...	...	...
	Diarrhœa, Dysentery	290	229	42	1	1	...	1	2	1	2	4	3	4	...
	Venereal Affections	44	35	2	...	...	...	...	3	2	2	...	...	...	...
	Erysipelas	8	3	...	...	...	...	...	...	2	1	1	1	...	...
	Pyæmia	9	1	1	...	2	1	...	...	1	2	1	...	...	...
	Puerperal Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Other Zymotics	2	...	1	...	...	...	...	...	...	...	1	...	...	...
II.	Parasitic Diseases	4	4	...	...	...	...	...	...	...	...	...	...	...	...
III.	Dietetic Diseases, Intemperance	40	...	...	...	...	...	1	6	13	13	7	...	...	...
IV.	Rheumatic Fever	17	...	...	1	1	4	2	3	2	2	2	...	...	...
	Rickets	20	8	12	...	..	...	...	...	...	...	...	...	...	...
	Cancer	125	...	1	...	...	3	1	6	14	37	38	22	3	...
	Tabes Mesenterica	32	15	15	2	...	...	...	...	...	...	...	...	...	...
	Hydrocephalus	63	23	25	9	4	...	...	2	...	...	...	...	...	...
	Phthisis	691	6	14	7	12	38	46	145	203	145	52	23	...	...
	Scrofula, Tuberculosis	109	46	34	4	7	4	2	3	4	2	2	1	...	...
	Constitutional Diseases (other)	51	...	4	2	1	1	...	7	6	9	10	8	3	...
V.	Premature Birth	185	185	...	...	...	...	...	...	...	...	...	...	...	...
	Malform. Develop. Dis. (other)	43	42	1	...	...	...	...	...	...	...	...	...	...	...
	Old Age	88	...	...	...	...	...	...	...	...	1	8	24	44	11
VI.	Apoplexy, Hemiplegia	167	1	...	2	...	1	1	4	8	45	42	43	18	2
	Epilepsy	12	...	1	...	2	...	...	1	5	...	2	1	...	...
	Convulsions	140	117	20	3	...	...	...	...	...	...	...	...	...	...
	Brain and Nervous Dis. (other)	225	52	38	13	7	4	3	14	22	19	22	23	8	...
	Heart Diseases	458	3	...	3	8	13	15	30	75	109	96	79	23	4
	Croup	10	5	4	1	...	...	...	...	...	...	...	...	...	...
	Bronchitis	575	143	75	4	1	3	4	12	32	51	123	92	31	4
	Pneumonia	825	156	173	23	5	26	32	64	109	103	84	35	14	1
	Respiratory Diseases (other)	85	10	12	2	1	4	2	6	9	16	9	10	4	...
	Digestive Organs (Diseases of)	282	99	34	7	9	11	5	10	27	30	29	18	3	...
	Urinary Organs (Diseases of)	157	1	7	5	2	1	4	10	26	27	31	35	8	...
	Reproductive Organs (Dis. of)	4	...	3	...	...	...	...	...	...	...	1	...	...	...
	Local Diseases (other)	45	10	6	2	2	4	3	3	5	3	4	3	...	...
VII.	Violence	219	41	31	11	8	10	9	18	34	30	14	4	9	...
VIII.	Marasmus, Atrophy	327	284	20	2	...	...	1	...	...	1	3	7	8	1
	Other Ill-defined Causes	158	42	11	...	...	...	...	9	12	33	21	24	6	...

TABLE D.—MANCHESTER, 1896.

Causes of Deaths at different Life Periods—FEMALES.

Classes	CAUSES OF DEATH	All Ages Total	Ages at Death—in years: Under 5 Years 0 to 1	Under 5 Years 1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
	All Causes	5684	1412	1060	149	79	109	120	316	426	493	601	575	295	49
I.	Smallpox	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Measles	305	72	221	10	1	...	...	1	...	...	...	...	...	...
	Scarlet Fever	93	2	60	22	4	1	2	2	...	...	...	...	...	...
	Typhus Fever	1	...	...	1	...	...	...	...	...	...	...	...	...	...
	Whooping Cough	201	73	116	12	...	...	...	...	...	...	...	...	...	...
	Diphtheria	25	...	22	1	...	2	...	...	...	...	...	...	...	...
	Membranous Croup	17	1	14	2	...	...	...	...	...	...	...	...	...	...
	Ill-defined Fever	1	...	1	...	...	...	...	...	...	...	...	...	...	...
	Enteric Fever	39	...	6	2	2	6	7	8	5	1	2	...	...	...
	Influenza	25	...	2	...	1	...	...	6	3	2	7	4	...	...
	Simple Cholera	8	7	1	...	...	...	...	...	...	...	...	...	...	...
	Diarrhœa, Dysentery	270	198	56	2	...	...	...	1	1	...	5	6	1	...
	Venereal Affections	30	27	...	...	...	...	1	...	2	...	...	...	...	...
	Erysipelas	9	2	3	...	...	...	...	...	1	...	1	1	1	...
	Pyæmia	5	1	...	...	1	...	...	2	...	1	...	...	...	...
	Puerperal Fever	17	...	...	...	...	1	5	8	3	...	...	...	...	...
	Other Zymotics	4	2	1	...	...	...	...	...	1	...	...	...	...	...
II.	Parasitic Diseases	4	4	...	...	...	...	...	...	...	...	...	...	...	...
III.	Dietetic Diseases, Intemperance	20	...	...	...	...	...	...	3	9	6	2	...	...	...
IV.	Rheumatic Fever	14	...	...	1	2	3	...	3	3	2	...	...	...	...
	Rickets	12	4	7	1	...	...	...	...	...	...	...	...	...	...
	Cancer	233	...	1	...	...	...	1	4	35	57	84	38	12	1
	Tabes Mesenterica	37	19	15	2	1	...	...	...	...	...	...	...	...	...
	Hydrocephalus	68	15	40	4	4	3	...	1	1	...	...	...	...	...
	Phthisis	387	1	12	7	11	43	37	103	95	52	15	9	2	...
	Scrofula, Tuberculosis	87	33	24	9	4	1	5	4	4	1	2	...	...	...
	Constitutional Diseases (other)	60	3	1	3	2	2	7	3	6	7	14	10	2	...
V.	Premature Birth	141	141	...	...	...	...	...	...	...	...	...	...	...	...
	Malform. Develop. Dis. (other)	30	29	1	...	...	...	...	...	...	...	...	...	...	...
	Old Age	161	...	...	...	...	...	...	...	...	1	11	50	83	16
VI.	Apoplexy, Hemiplegia	225	1	1	...	1	1	2	4	19	37	63	69	24	3
	Epilepsy	13	...	...	...	2	2	1	4	1	1	1	1	...	...
	Convulsions	95	69	21	4	1	...	...	...	...	...	...	...	...	...
	Brain and Nervous Dis. (other)	214	32	40	8	3	5	8	18	16	20	20	26	16	2
	Heart Diseases	485	4	3	6	10	15	14	28	66	84	106	97	44	8
	Croup	5	...	5	...	...	...	...	...	...	...	...	...	...	...
	Bronchitis	671	147	75	5	2	1	3	12	26	69	124	139	59	9
	Pneumonia	559	108	179	16	9	6	5	31	56	60	38	37	11	3
	Respiratory Diseases (other)	74	11	13	5	4	3	...	6	3	4	11	7	6	1
	Digestive Organs (Diseases of)	277	73	39	6	3	4	8	21	16	27	44	29	7	...
	Urinary Organs (Diseases of)	90	1	6	1	1	1	5	7	11	25	19	11	2	...
	Reproductive Organs (Dis. of)	53	...	...	...	1	2	5	19	20	3	2	...	1	...
	Local Diseases (other)	32	2	5	3	5	2	...	4	3	4	2	2	...	...
VII.	Violence	164	44	31	16	2	4	3	8	7	13	13	14	6	3
VIII.	Marasmus, Atrophy	283	240	20	...	...	...	...	...	...	1	3	10	8	1
	Other Ill-defined Causes	140	46	18	...	2	1	1	5	13	15	12	15	10	2

TABLE E.

City of Manchester, 1896.—Causes of Death in Infancy and Childhood.

Causes of Death	Under One Year			Total under One Year	One and under Five Years				Total under Five Years
	Under 3 months	3–6 months	6–12 months		1–	2–	3–	4–	
All Causes	**1,392**	**674**	**1,049**	**3,115**	**1,039**	**477**	**310**	**202**	**5,143**
Measles	7	13	117	137	194	116	61	35	543
Scarlatina	...	1	4	5	21	36	39	33	134
Whooping Cough	24	32	79	135	111	53	28	15	342
Diphtheria (Memb: Croup)	...	...	5	5	18	19	17	12	71
Fever (various forms)	...	...	2	2	3	1	7	...	13
Diarrhœa	114	157	156	427	82	8	6	2	525
Syphilis	39	19	4	62	1	1	...	...	64
Hydrocephalus	2	11	25	38	34	17	10	4	103
Scrofula (other)	35	42	43	120	59	28	16	11	234
Premature Birth	317	6	3	326	...	...	...	...	326
Convulsions	121	29	36	186	17	12	8	4	227
Brain Diseases (other)	16	17	55	88	31	20	11	18	168
Lung Diseases	136	136	308	580	322	109	67	38	1,116
Teething	...	3	26	29	32	1	...	...	62
Atrophy, Marasmus	327	118	79	524	27	10	3	...	564
Found Dead in Bed	64	27	10	101	...	3	...	...	104
Suffocation	5	3	1	9	...	...	...	1	10
Violence (other forms)	2	1	2	5	17	20	15	8	65
Ill-defined Causes	28	7	23	58	20	4	3	...	85
Unclassified	157	52	71	278	50	19	19	21	387

TABLE F, 1871 TO 1896.—MANCHESTER.—ESTIMATED POPULATIONS. ANNUAL RATES OF MARRIAGES, BIRTHS, AND DEATHS *(a)* from all causes, and *(b)* from specified causes; also the percentages to total deaths of Inquest Cases, and of Deaths in Public Institutions.

Years	Estimated Populations (Mean)	Persons Married	Annual Rates per 1,000 Persons living: Births	Deaths (All Causes)	Smallpox	Measles	Scarlet Fever	Diphtheria	Whooping Cough	Typhus Fever	Enteric Fever	Simple Continued Fever	Diarrhœa and Dysentery	English Cholera	Violence	Percentages to Total Deaths: Inquest Cases	Deaths in Public Institutions	Years
Quinquennial Averages 1871–75	477,344	24·6	38·9	28·3	0·26	0·64	1·08	0·08	0·78	0·14	0·43	0·21	1·92	0·03	0·94	7·2	13·4	1871–75 Quinquennial Averages
1876–80	509,802	18·6	38·7	26·2	0·24	0·53	1·07	0·13	0·84	0·08	0·29	0·11	1·22	0·04	0·89	7·5	14·3	1876–80
1881–85	542,746	17·9	35·1	23·6	0·04	0·71	0·48	0·10	0·68	0·05	0·20	0·03	0·96	0·03	0·72	7·0	15·9	1881–85
1886–90	575,630	16·6	33·4	24·6	0·02	0·83	0·50	0·32	0·54	0·02	0·30	0·01	1·06	0·02	0·78	6·9	17·7	1886–90
1891–95	517,801	16·9	33·2	23·6	0·03	0·62	0·26	0·27	0·64	0·00	0·24	0·01	1·14	0·05	0·77	7·1	19·2	1891–95
Avge. 25 yrs. 1871–95	524,664	18·9	35·8	25·3	0·11	0·66	0·68	0·18	0·70	0·06	0·29	0·07	1·26	0·03	0·82	7·1	16·1	1871–95 Avge. 25 yrs.
1871	464,866	24·2	38·1	29·3	0·72	0·84	0·71	0·04	0·61	0·20	0·45	0·35	2·58	0·02	0·90	6·3	13·7	1871
1872	471,023	25·8	39·3	27·3	0·32	0·33	1·02	0·09	1·22	0·17	0·40	0·17	2·07	0·04	0·90	6·9	13·5	1872
1873*	477,261	24·8	38·3	28·0	0·08	0·85	1·43	0·05	0·38	0·15	0·46	0·20	1·92	0·05	0·83	7·3	12·8	1873*
1874	483,582	23·8	39·3	28·7	0·05	0·62	1·33	0·07	0·83	0·08	0·39	0·19	1·71	0·01	0·94	7·3	13·5	1874
1875	489,987	24·2	39·5	28·4	0·11	0·54	0·92	0·14	0·88	0·11	0·44	0·12	1·32	0·01	1·12	8·4	13·3	1875
1876	496,476	20·2	40·0	28·0	0·80	0·65	1·13	0·10	0·81	0·16	0·42	0·17	1·50	0·02	1·05	7·4	14·4	1876
1877	503,051	19·8	39·5	26·1	0·36	0·59	1·05	0·13	0·84	0·11	0·29	0·12	0·82	0·01	0·86	7·9	14·9	1877
1878	509,714	18·8	39·7	26·8	0·01	0·45	1·07	0·14	0·68	0·06	0·31	0·10	1·42	0·07	0·91	7·6	14·4	1878
1879*	516,464	16·8	37·3	25·2	0·00	0·35	1·07	0·13	1·09	0·02	0·18	0·07	0·62	0·01	0·81	7·3	14·2	1879*
1880	523,304	17·2	36·9	25·0	0·01	0·63	1·03	0·14	0·76	0·04	0·26	0·07	1·73	0·09	0·80	7·1	13·7	1880
1881	530,051	17·8	35·9	22·8	0·03	0·29	0·34	0·09	0·71	0·03	0·17	0·06	0·73	0·02	0·84	8·1	15·9	1881
1882	536,324	18·8	35·7	24·0	0·05	0·89	0·34	0·11	0·87	0·10	0·25	0·04	1·00	0·03	0·67	7·2	14·5	1882
1883	542,671	17·8	34·9	24·4	0·01	0·71	0·81	0·11	0·62	0·05	0·20	0·03	0·95	0·03	0·73	7·0	15·5	1883
1884*	549,093	18·0	34·4	23·4	0·01	0·57	0·74	0·08	0·49	0·03	0·19	0·03	1·46	0·05	0·65	6·2	17·3	1884*
1885	555,591	17·0	34·8	23·6	0·08	1·08	0·17	0·10	0·71	0·04	0·17	0·01	0·64	0·02	0·69	6·4	16·4	1885
1886	562,166	16·4	34·7	24·1	0·00	0·27	0·41	0·15	0·57	0·03	0·29	0·01	1·34	0·04	0·71	7·2	17·0	1886
1887	568,819	16·6	33·9	25·4	0·01	1·54	0·63	0·23	0·50	0·02	0·31	0·01	1·19	0·02	0·77	6·9	16·1	1887
1888	575,550	16·0	33·3	23·3	0·07	0·27	0·42	0·36	0·79	0·02	0·33	0·02	0·71	0·01	0·74	6·7	18·3	1888
1889	582,362	17·0	33·1	24·2	0·00	1·22	0·45	0·51	0·45	0·01	0·31	0·01	1·00	0·03	0·89	6·5	18·2	1889
1890*	589,253	17·0	31·8	26·2	...	0·83	0·60	0·36	0·37	0·01	0·27	0·02	1·04	0·02	0·79	7·0	19·1	1890*
1891†	‡ 508,673	17·2	33·8	26·0	...	0·43	0·22	0·25	1·02	0·01	0·37	0·01	0·81	0·04	0·79	6·8	18·4	1891†
1892†	‡ 513,196	17·2	33·4	23·2	0·00	0·72	0·27	0·25	0·72	0·00	0·24	0·01	0·79	0·02	0·77	7·4	18·2	1892†
1893†	‡ 517,760	16·0	33·4	24·3	0·09	0·57	0·27	0·35	0·46	0·00	0·25	0·01	1·75	0·10	0·76	6·9	18·7	1893†
1894†	‡ 522,365	16·8	31·8	19·8	0·04	0·42	0·22	0·29	0·55	...	0·17	0·01	0·70	0·02	0·75	7·5	21·3	1894†
1895†	‡ 527,010	17·4	33·4	24·5	0·00	0·96	0·33	0·21	0·47	...	0·18	0·01	1·66	0·06	0·80	6·9	19.2	1895†
1896†*	‡ 531,697	18·3	32·8	22·0	...	1·05	0·37	0·15	0·66	0·00	0·22	0·01	1·04	0·02	0 71	7·4	19·7	1896†*

* The facts for these years are for 53 instead of 52 weeks; corrections have, therefore, been made in calculating the rates.

† The populations and rates for the years subsequent to 1890, except the marriage rates, relate to the City of Manchester as enlarged by the Act of that year. The facts and rates for previous years are those for the three Unions of Manchester, Chorlton, and Prestwich, which have been taken to approximately represent "Manchester."

‡ These figures include a proportion of the inmates of certain Extra-municipal Institutions which receive patients from the City of Manchester, and are therefore in excess of the estimates of the Registrar-General.

TABLE G, 1881 to 1896.—Manchester.

Annual Rates of Mortality from certain causes of death.

	Year	Annual Rates per 1,000 Persons living										Rates per 1,000 Births	
		Cancer	Tabes Mesenterica	Phthisis	Other Tuberculous Diseases	Diseases of Nervous System	Diseases of Circulatory System	Diseases of Respiratory System	Diseases of Digestive System	Diseases of Urinary System	Diseases of Generative System	Puerperal Fever	Childbirth
Quinquennial Periods	1881–85	0·50	0·35	2·42	0·57	3·28	1·37	5·41	1·23	0·48	0·08	3·03	1·99
	1886–90	0·64	0·36	2·24	0·59	3·09	1·73	5·76	1·23	0·61	0·08	3·22	2·13
	1891–95	0·62	0·22	2·09	0 75	2·50	1·75	5·56	1·07	0·52	0·07	2·75	3·42
Average 15 years	1881–95	0·58	0·31	2·25	0·63	2·96	1·61	5·58	1·18	0·54	0·08	3·00	2·52
	1881	0·48	0·28	2·46	0·52	3·33	1·19	5·57	1·24	0·39	0·07	3·15	1·37
	1882	0·44	0·40	2·41	0·61	3·35	1·34	5·33	1·19	0·45	0·08	3·92	1·62
	1883	0·54	0·34	2·54	0·59	3·32	1·33	5·66	1·20	0·50	0·06	2·27	1·58
	1884*	0·51	0·39	2·34	0·56	3·27	1·44	4·88	1·23	0·59	0·10	2·81	2·55
	1885	0·51	0·36	2·34	0·56	3·12	1·53	5·59	1·28	0·49	0·08	3·05	2·84
	1886	0·56	0·43	2·44	0·59	3·30	1·53	5·43	1·26	0·57	0·08	2·67	1·85
	1887	0·62	0·39	2·19	0·53	3·17	1·66	5·72	1·23	0·53	0·08	3·58	1·35
	1888	0·65	0·31	2·14	0·62	3·19	1·72	5·31	1·16	0·62	0·10	4·12	1·77
	1889	0·70	0·36	2·12	0·59	2·94	1·79	5·06	1·28	0·64	0·08	3·06	1·87
	1890*	0·65	0·33	2·33	0·62	2·87	1·93	7·28	1·22	0·66	0·08	2·68	3·89
	1891†	0·63	0·25	2·20	0·78	3·10	1·89	6·77	1·03	0·55	0·07	3·08	4·01
	1892†	0·61	0·21	2·05	0·75	2·44	1·84	5·44	1·14	0·53	0·05	3·79	4·54
	1893†	0·59	0·26	2·05	0·76	2·51	1·66	5·53	1·20	0·53	0·07	3·70	3·94
	1894†	0·66	0·18	1·97	0·67	2·19	1·58	4·35	0·96	0·49	0·04	1·93	2·77
	1895†	0·63	0·22	2·16	0·77	2·28	1·79	5·73	1.04	0·49	0·11	1·25	1·82
	1896†*	0·66	0·13	2·00	0.60	2·02	1·75	5·19	1·04	0·46	0·11	0·96	1·47

* The facts for these years are for 53 instead of 52 weeks; corrections have therefore been made in calculating the rates.

† The rates of mortality for the years subsequent to 1890 refer to the City of Manchester as enlarged by the Act of that year. The rates for 1890 and for previous years are those for the three Unions of Manchester, Chorlton, and Prestwich, which have been taken to approximately represent "Manchester."

TABLE H, 1896.—Population, Area, Density. Total Births and Deaths, with Birth and Death Rates.

[Institution Populations, Births and Deaths, distributed.]

STATISTICAL DIVISIONS	Estimated Population	Area in Acres	Persons to an Acre	BIRTHS		DEATHS	
				Total	Rate per 1,000	Total	Rate per 1,000
City of Manchester	**531,697**	**12,788**	**42**	**17,686**	**32·75**	**11,874**	**21·99**
I. Manchester Township..	146,186	1,646	89	5,309	35·75	4,261	28·70
II. North Manchester	139,013	7,191	19	4,601	32·58	2,514	17·80
III. South Manchester	246,498	3,951	62	7,776	31·06	5,099	20·36
I. Ancoats	45,991	400	115	1,888	40·41	1,364	29·20
I. Central	36,584	748	49	1,160	31·22	1,051	28.28
I. St. George's.....	63,611	498	128	2,261	34·99	1,846	28·57
II. Cheetham	30,660	919	33	1,043	33·49	444	14·26
II. Crumpsall	9,209	733	13	186	19.88	146	15·61
II. Blackley	7,888	1,840	4	215	26·83	120	14·98
II. Harpurhey	11,265	193	58	405	35·39	231	20·19
II. Moston	6,338	1,297	5	220	34·17	111	17·24
II. Newton Heath	36,602	1,350	27	1,148	30·88	661	17·78
II. Bradford	22,461	288	78	845	37·04	535	23·45
II. Beswick	10,602	96	110	394	36·59	180	16·71
II. Clayton	3,988	475	8	145	35·79	86	21·23
III. Ardwick	37,128	509	73	1,355	35·93	778	20·63
III. Openshaw	29,686	581	51	972	32.23	585	19·40
III. West Gorton	27,236	342	80	983	35·53	554	20·03
III. Rusholme and Kirk. ...	19,162	1,396	14	464	23·84	289	14·85
III. Chorlton-upon-Medlock	61,308	646	95	1,605	25·77	1,247	20·02
III. Hulme.....	71,978	477	151	2,397	32·79	1,646	22·51

TABLE J, 1896.

BIRTHS REGISTERED IN THE CITY OF MANCHESTER, IN ITS MAIN DIVISIONS, AND IN TOWNSHIPS; DISTINGUISHING LEGITIMATE AND ILLEGITIMATE BIRTHS; ALSO THE PROPORTION OF MORTALITY AMONG INFANTS OF BOTH CLASSES UNDER ONE YEAR OF AGE. [INSTITUTION BIRTHS AND DEATHS DISTRIBUTED.]

STATISTICAL AREAS	BIRTHS		Percentage of Illegitimate Births to Total Births	DEATHS UNDER 1 YEAR		PROPORTION OF DEATHS UNDER 1 YEAR PER 1,000 BIRTHS		
	Total	Illegitimate		Total	Of Illegitimate Children	Total	Legitimate	Illegitimate
City of Manchester	**17,686**	**744**	**4·21**	**3,115**	**279**	**176**	**167**	**375**
(DIVISIONS)								
I. Manchester Township	5,309	271	5·10	1,097	108	207	196	399
II. North Manchester	4,601	114	2·48	670	38	146	141	333
III. South Manchester	7,776	359	4·61	1,348	133	173	164	370
I. Ancoats	1,888	73	3·87	383	28	203	196	384
I. Central	1,160	78	6·73	251	34	216	201	436
I. St. George's	2,261	120	5·31	463	46	205	195	383
II. Cheetham	1,043	25	2·40	113	13	108	98	520
II. Crumpsall	186	7	3·76	32	2	172	168	286
II. Blackley	215	4	1·86	26	2	121	114	500
II. Harpurhey	405	10	2·47	76	3	188	185	300
II. Moston	220	5	2·27	23	1	105	102	200
II. Newton Heath	1,148	29	2·53	167	4	145	146	138
II. Bradford	845	23	2·72	160	10	189	182	435
II. Beswick	394	7	1·78	50	2	127	124	286
II. Clayton	145	4	2·76	23	1	159	156	250
III. Ardwick	1,355	47	3·47	214	22	158	147	468
III. Openshaw	972	38	3·91	177	16	182	172	421
III. Gorton (West)	983	40	4·07	156	12	159	153	300
III. Rusholme and Kirk.	464	21	4·52	67	5	144	140	238
III. Chorlton-on-Medlock	1,605	116	7·22	289	41	180	167	353
III. Hulme	2,397	97	4·05	445	37	186	177	381

TABLE K, 1896.

Infantile Mortality in Manchester City, and its Three Main Divisions.

Death-rates under One Year per 1,000 Births.

Causes of Death	City of Manchester	Manchester Township	North Manchester	South Manchester
All Causes	176·13	206·63	145·62	173·35
Measles	7·75	13·75	5·22	5·14
Whooping Cough	7·63	10·17	5·00	7·46
Other Com: Infectious Diseases*	0·68	0·57	...	1·16
Diarrhœa	24·14	29·76	19·34	23·15
Tubercular Diseases†	8·93	7·91	5·00	11·96
Convulsions	10·52	13·75	7·17	10·29
Other Nervous Diseases‡	4·98	5·09	4·78	5·02
Lung Diseases	32·79	35·98	30·65	31·89
Wasting Diseases§.....	48·06	58·01	41·08	45·40
Suffocation	0·51	0·75	0·65	0·26
Found dead in bed	5·71	7·16	4·56	5·40

* These are Smallpox, Scarlatina, Diphtheria, Membranous Croup, and various forms of "Fever," including the chief form of Typhus and Typhoid.

† These are Phthisis, Tubercular Meningitis (Hydrocephalus), Tabes Mesenterica, and General Tuberculosis (Scrofula).

‡ These are Meningitis, and other diseases of the Brain and Spinal Cord.

§ These are Premature Birth, and such ill-defined cases as Atrophy, Marasmus, Debility, Inanition, &c.

TABLE L, 1896.—CITY OF MANCHESTER. ANNUAL RATES OF MORTALITY PER 1,000 PERSONS LIVING AT ALL AGES, IN THE CITY OF MANCHESTER AND IN ITS STATISTICAL AREAS, FROM CERTAIN DISEASES AND GROUPS OF DISEASES.

CAUSES OF DEATH	City of Manchester	Manchester Township	North Manchester	South Manchester	City of Manchester Average of 5 years 1891-95
All Causes	21·99	28·70	17·80	20·36	23·54
Smallpox	...	...	...	...	0·03
Measles	1·05	1·89	1·01	0·57	0·62
Scarlet Fever	0·37	0·41	0·24	0·41	0·26
Typhus Fever	0·00	0·01	...	...	...
Whooping Cough	0·66	0·92	0·50	0·60	0·64
Diphtheria, Membranous Croup	0·15	0·13	0·23	0·12	0·32
Ill-defined Fever	0·01	...	0·01	0·01	0·01
Enteric Fever	0·22	0·28	0·18	0·20	0·24
Influenza	0·10	0·13	0·11	0·07	0·33
Diarrhœa, Dysentery	1·04	1·43	0·79	0.94	1·14
Erysipelas	0·03	0·05	0·02	0·03	0·06
Pyæmia	0·03	0·03	0·04	0·01	0·02
Puerperal Fever	0·03	0·03	0·04	0·03	0·05
Rheumatic Fever	0·06	0·07	0·05	0·06	0·08
Rickets	0·06	0·05	0·05	0·07	0·07
Cancer	0·66	0·63	0·54	0·76	0·62
Tabes Mesenterica	0·13	0·11	0·11	0·15	0·22
Hydrocephalus	0·24	0·28	0·13	0·29	0·35
Phthisis	2·00	3·12	1·19	1·78	2·09
Scrofula, Tuberculosis	0·36	0·39	0·24	0·42	0·39
Premature Birth	0·60	0·75	0·56	0·54	0·58
Old Age	0·46	0·71	0·31	0·40	0·50
Brain and Nervous Diseases	2·02	2·47	1·78	1·89	2·50
Heart Diseases	1·75	2·22	1·43	1·65	1·75
Bronchitis	2·31	3·01	1·84	2·15	2·67
Pneumonia	2·56	3·37	1·90	2·46	2·45
Respiratory Diseases (other)	0·32	0·38	0·25	0·33	0·44
Digestive Organs (Diseases of)	1·04	1·30	0·94	0·93	1·07
Urinary Organs (Diseases of)	0·46	0·56	0·45	0·40	0·52

TABLE M, 1896.—CITY OF MANCHESTER.—ANNUAL RATES OF MORTALITY AT SIX GROUPS OF AGES, * PER 1,000 LIVING AT THOSE AGE GROUPS, FROM CERTAIN PREVALENT DISEASES, AND GROUPS OF DISEASES.

CAUSES OF DEATH		Under 5 Years	5 to 15 Years	15 to 25 Years	25 to 45 Years	45 to 65 Years	Over 65 Years
All Causes		75·92	3·81	4·81	11.20	33·27	114·85
Smallpox		...	...	...	...	...	...
Measles		8·02	0·19	...	0·01	...	...
Scarlatina		1·98	0·44	0.06	0·03	...	...
Diphtheria, Memb. Croup		1·05	0·07	0·03	0·01	...	...
Whooping Cough		5·05	0·14	...	...	...	...
Fever	Typhus	...	0·01	...	...	...	...
	Enteric	0·13	0·08	0·37	0·29	0·19	...
	Continued	0·06	...	...	...	...	...
Diarrhœal Diseases		7·93	0·03	0·01	0·03	0·15	1·01
Tubercular Diseases		4·97	0·72	1·64	3·61	3·75	2·53
Diseases of ...	Brain	5·80	0·38	0·26	0·74	3·76	17·08
	Heart	0·15	0·22	0·52	1·27	5·46	18·45
	Lungs	16·48	0·65	0·82	2·34	9·57	33·51
	Digestive System	3·62	0·21	0·26	0·47	1·80	4·13
	Urinary System	0·22	0·07	0·10	0·35	1·41	4·05
Other Diseases		20·48	0·60	0·75	2·06	7·19	34·09

* For death-rates at all ages, see Table L.

TABLE N, 1896.—ANNUAL RATES OF MORTALITY IN STATISTICAL DIVISIONS, AT SIX GROUPS OF AGES,* PER 1,000 LIVING AT THOSE AGE GROUPS, FROM CERTAIN PREVALENT DISEASES, AND GROUPS OF DISEASES.

CAUSES OF DEATH	Under 5 Years			5 to 15 Years			15 to 25 Years		
	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester
All Causes	101·29	62·58	68·62	4·68	2·94	3·83	5·27	4·48	4·73
Smallpox	...	...	...	...	...	...	...	...	...
Measles	14·60	7·42	4·40	0·28	0·18	0·15	...	...	...
Scarlatina	2·59	1·30	2·02	0·25	0·27	0·65	0·10	0·03	0·06
Diphtheria, Memb. Croup	0·97	1·52	0·81	0·06	0·12	0·04	...	0·03	0·04
Whooping Cough	7·06	3·57	4·72	0·18	0·15	0·11	...	...	...
Fever — Typhus	...	...	...	0·03	...	...	...	...	...
Fever — Enteric	0·22	0·11	0·10	0·09	0·12	0·05	0·37	0·31	0·39
Fever — Continued	...	0·11	0·07	...	...	...	...	...	...
Diarrhœal Diseases	11·10	5·74	7·33	0·06	0·03	0·02	...	0·03	...
Tubercular Diseases	5·23	3·46	5·73	0·77	0·49	0·83	1·72	1·53	1·65
Diseases of — Brain	7·92	4·82	5·11	0·55	0·30	0·33	0·24	0·28	0·26
Diseases of — Heart	0·05	0·11	0·23	0·34	0·12	0·22	0·68	0·56	0·41
Diseases of — Lungs	20·85	14·02	15·31	1·05	0·36	0·58	1·01	0·59	0·83
Diseases of — Digestive System	4·53	3·03	3·42	0·25	0·24	0·16	0·34	0·21	0·24
Diseases of — Urinary System	0·32	0·22	0·16	0·06	0·09	0·07	0·14	0·10	0·08
Other Diseases	25·86	17·16	19·21	0·71	0·46	0·62	0·68	0·80	0·77

CAUSES OF DEATH	25 to 45 Years			45 to 65 Years			Over 65 Years		
	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester
All Causes	15·74	8·78	9·84	42·34	26·18	31·36	141·49	90·88	113·28
Smallpox	...	...	...	...	...	...	...	...	...
Measles	0·02	...	...	...	...	...	...	...	...
Scarlatina	0·05	...	0·03	...	...	...	...	...	...
Diphtheria, Memb. Croup	...	...	0·01	...	...	...	...	...	...
Whooping Cough	...	...	...	...	...	...	...	...	...
Fever — Typhus	...	...	...	...	...	...	...	...	...
Fever — Enteric	0·39	0·25	0·24	0·33	0·06	0·18	...	...	...
Fever — Continued	...	...	...	...	...	...	...	...	...
Diarrhœal Diseases	0·02	0·03	0·04	0·10	0·11	0·21	0·85	0·57	1·33
Tubercular Diseases	5·76	2·09	3·17	6·61	1·52	3·13	5·07	0·29	2·36
Diseases of — Brain	1·09	0·61	0·61	4·38	3·71	3·40	15·78	15·72	18·46
Diseases of — Heart	1·62	1·08	1·17	7·04	4·55	4·95	22·27	16·00	17·72
Diseases of — Lungs	2·89	1·84	2·29	12·89	7·02	8·83	44·53	22·01	33·67
Diseases of — Digestive System	0·58	0·61	0·34	2·28	1·40	1·70	5.07	4·00	3·69
Diseases of — Urinary System	0·49	0·38	0·24	1·62	1·35	1·31	4·51	4·29	3·69
Other Diseases	2·84	1·89	1·69	7·09	6·46	7·64	43·40	28·01	32·34

* For death-rates at all ages, see Table L.

TABLE O, 1896.

MANCHESTER.—Certification of the Causes of Death in the Main Divisions and in Districts.

STATISTICAL AREAS	Total Deaths	Certified by		Not Certified	Proportion per cent. of Deaths		
					Certified by		Not Certified
		Registered Medical Practitioners	Coroner		Regist'd Medical Practitioners	Coroner	
City of Manchester	**11,874**	**10,837**	**882**	**155**	**91·3**	**7·4**	**1·3**
(DIVISIONS)							
I. Manchester Township ...	4,261	3,876	316	69	91·0	7·4	1·6
II. North Manchester	2,514	2,317	180	17	92·1	7·2	0·7
III. South Manchester	5,099	4,644	386	69	91·0	7·6	1·4
I. Ancoats	1,364	1,229	114	21	90·1	8·4	1·5
I. Central	1,051	944	90	17	89·8	8·6	1·6
I. St. George's	1,846	1,703	112	31	92·2	6·1	1·7
II. Cheetham	444	408	33	3	91·9	7·4	0·7
II. Crumpsall	146	129	17	...	88·4	11·6	...
II. Blackley	120	112	8	...	93·3	6·7	...
II. Harpurhey	231	217	14	...	93·9	6·1	...
II. Moston	111	102	9	...	91·9	8·1	...
II. Newton Heath	661	610	46	5	92·2	7·0	0·8
II. Bradford	535	492	36	7	92·0	6·7	1·3
II. Beswick	180	168	12	...	93·3	6·7	...
II. Clayton	86	79	5	2	91·9	5·8	2·3
III. Ardwick	778	718	49	11	92·3	6·3	1·4
III. Openshaw	585	542	41	2	92·7	7·0	0·3
III. Gorton (West)	554	503	44	7	90·8	7·9	1·3
III. Rusholme and Kirk. ...	289	264	19	6	91·3	6·6	2·1
III. Chorlton-upon-Medlock	1,247	1,128	100	19	90·5	8·0	1·5
III. Hulme	1,646	1,489	133	24	90·4	8·1	1·5

TABLE P, 1896.—PARTICULARS AS TO MANCHESTER PATIENTS UNDER TREATMENT IN THE SEVERAL FEVER HOSPITALS DURING THE YEAR; ALSO OF PATIENTS FROM OUTSIDE DISTRICTS SENT TO MONSALL AND CLAYTON DURING THE SAME PERIOD.

Disease	Hospital	In Hospital commence-ment of year	Admitted	Discharged	Died	Remaining in Hospital close of year
Smallpox	Monsall and Clayton Hospitals	...	1	1	...	...
	Total	...	1	1	...	...
Scarlet Fever	Monsall	304	1,641	1,587	151	207
	Pendlebury	21	139	131	9	20
	Other Hospitals	...	...	...	...	...
	Total	325	1,780	1,718	160	227
Diphtheria	Monsall	2	46	37	7	4
	Pendlebury	...	1	...	1	...
	Other Hospitals	...	1	1	...	...
	Total	2	48	38	8	4
Enteric Fever	Monsall	32	227	187	46	26
	Pendlebury	...	...	...	...	...
	Other Hospitals	1	31	18	11	3
	Total	33	258	205	57	29
Typhus Fever	Monsall	...	...	...	...	...
	Pendlebury	...	...	...	...	...
	Other Hospitals	...	...	...	...	...
	Total	...	...	...	...	...
Other Acute Diseases	Monsall	7	208	177	36	2
	Pendlebury	...	...	...	...	...
	Other Hospitals	...	...	...	...	...
	Total	7	208	177	36	2
All Diseases		367	2,295	2,139	261	262

PATIENTS SENT TO MONSALL AND CLAYTON, FROM DISTRICTS OUTSIDE THE CITY, DURING THE YEAR 1896.

Disease	Withington	Stretford	Moss Side	Swinton &c	Sale	Prestwich	Gorton	Failsworth	Other Districts
Smallpox	...	...	...	...	...	...	...	...	...
Scarlatina	60	46	38	1	4	6	13	18	2
Diphtheria	1	7	...	...	2	...	...	...	...
Enteric Fever	3	6	5	3	3	...	9	1	...
Other Diseases	3	3	1	8	1	2	...	1	4

TABLE Q, 1896.—Work of Sanitary Department for the Year.

		TOWNSHIPS																		
		Ancoats	Central	St. George's	Cheetham	Crumpsall	Blackley	Harpurhey	Moston	Newton	Bradford	Beswick	Clayton	Ardwick	Openshaw	Gorton (West)	Rusholme and Kirkmanshulme	Chorlton-upon-Medlock	Hulme	TOTAL
Complaints to Sanitary Superintendent ...		1,232	1,314	1,278	465	103	16	54	53	455	940	361	22	398	306	258	67	871	1,000	9,193
Inspections of	Dwelling-houses	4,580	2,787	5,427	3,601	664	253	442	383	1,918	654	395	2,783	1,797	2,270	1,139	2,023	3,252	5,757	40,125
	Newly-infected Dwelling-houses	186	180	294	185	33	28	56	38	185	113	103	43	201	150	121	71	365	567	2,919
	Cellars.....	157	39	13	...	35	...	...	...	...	6	...	...	...	...	...	...	...	13	263
	Schools	110	39	80	57	9	12	8	...	33	36	13	1	33	53	36	42	64	29	655
	Ships	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	....	126
	Factories and Workshops	51	224	56	35	3	...	13	...	6	5	...	...	3	7	6	...	29	16	454
	Lodging-houses	141	134	365	57	...	...	3	...	19	...	1	...	16	...	2	...	34	62	834
	Offensive Trades	33	6	4	6	...	...	6	3	65	72	2	28	39	17	6	...	1	2	290
	Dairies and Milkshops.....	270	97	385	180	20	28	23	64	168	44	16	141	117	33	78	391	272	277	2,604
	Bakehouses	239	376	282	315	6	15	64	7	74	112	43	7	176	143	93	55	395	503	2,905
	Canal Boats	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2,017
	Slaughter-houses	1	...	...	...	...	...	1	...	7	...	...	...	...	1	...	122	...	1	133
	Tips for Refuse.....	...	7	24	...	9	4	122	76	24	1	1	16	...	19	...	...	...	...	303
	Miscellaneous Inspections	2,717	2,660	3,834	1,434	582	805	1,313	1,320	3,060	946	347	460	854	2,089	3,465	2,914	1,635	4,434	34,869
	Factories and Workshops by Shop Hours, &c., Inspectors.....	1,301	5,268	1,130	1,693	9	24	64	15	210	128	93	7	531	259	234	213	1,782	1,195	14,156
	Shops by Shop Hours, &c., Inspectors	473	1,156	713	402	6	48	75	...	213	108	114	...	355	231	128	291	869	846	6,028
Re-inspections of Infected Dwelling-houses		670	521	871	473	105	98	181	135	643	282	224	272	580	641	178	282	770	1,611	8,537
Rooms Fumigated after Infectious Disease		365	336	957	326	50	54	86	129	443	230	209	78	447	436	277	125	463	250	5,261
Drains Tested by Smoke Machine.....		171	411	175	106	24	15	1	...	24	...	15	1	6	18	33	42	120	27	1,174
Smoke Abatement	Observations made	128	405	123	33	29	13	4	23	123	111	35	239	76	108	39	8	89	63	1,649
	Proceedings before Magistrates	13	23	3	1	2	...	...	3	14	10	3	8	18	9	8	...	16	13	144
Food Adulteration	Samples Collected for Analysis	222	163	130	51	19	10	43	18	117	87	47	16	152	86	114	37	160	170	*1,650
	Proceedings before Magistrates	7	18	8	...	...	...	3	...	5	6	...	...	9	5	10	...	3	7	81
Ashpits reported to Cleansing Department for emptying		23	11	2	98	341	164	109	488	1,398	152	2	504	...	587	196	331	32	7	4,445
Receptacles reported to Cleansing Department for emptying.....		498	172	261	991	5	2	29	...	133	18	15	3	12	3	5	70	194	108	2,519
Notices issued for Abatement of Nuisances.		1,423	1,512	2,428	1,332	178	146	238	115	776	321	206	151	622	688	451	388	1,378	1,782	14,135
Letters written for Abatement of Nuisances		75	70	111	75	9	3	17	2	55	20	8	3	24	36	24	29	52	41	654
Reports made to Medical Officer of Health		1,228	1,086	1,654	533	110	144	249	134	628	725	357	94	1,144	600	667	331	1,194	1,457	12,335
Legal proceedings taken		85	17	109	15	...	...	3	...	11	7	1	1	4	1	4	2	9	27	296
Total Nuisances abated		1,131	1,102	2,291	1,208	153	120	204	74	710	251	145	110	457	616	359	311	1,104	1,524	11,870
Number of Cottages under Five Rooms...		7,435	4,964	9,037	729	522	923	688	367	4,409	2,621	1,285	402	4,552	3,510	3,221	826	3,805	8,167	57,463

* Eight samples procured outside the City.

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